Vol. 1000 Number 1

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

November 4, 1980

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

November 4, 1980 Volume 1000 Number 1

CONTENTS

	Page
Patent and Trademark Office Notices	
Patent Cooperation Treaty (PCT) Information	1000 OG 2
Patent Suits	1000 OG 2
Reissue Applications Filed	1000 OG 4
Patent Certificates of Correction	1000 OG 5
Patents Available for Licensing or Sale	1000 OG 5
National Technical Information Service	1000 OG 6
Reference Collections of U.S. Patents	1000 OG 7
Condition of Patent Applications	1000 OG 8
Xerox License Offer	1000 OG 9
Defensive Patent Publications (100,001)	1
Reissue Patents Granted (30,424)	3
Plant Patents Granted (4,607)	7
Patents Granted	
General and Mechanical (4,231,117)	9
Chemical (4,231,741)	225
Electrical (4,232,183)	349
Design Patents Granted (257,471)	427
Index of Patentees	PI 1
Indices of Reissue, Design and Plant Patentees	PI 45
Index of Applicants of Defensive Publications	PI 46
Classification of	
Patents (Including Reissues)	PI 47
Designs, Plants and Defensive Publications	PI 50
Geographical Index of Residence of Inventors	
Patents (Including Reissues)	PI 51
Designs and Plants	PI 52
Change of Address Form and Subscription Order Form	Back Page

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $300.00 per annum for first-class mailing, also available as fourth-class mail at $200.00; foreign first-class mailing rates will be furnished upon request; single copies each, $4.00 domestic, $5.00 foreign.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.

GENERAL INFORMATION concerning TRADEMARKS, price $1.50 each.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS AND DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty Information

For information concerning the PCT consult the notice entitled "update of information concerning the Patent Cooperation Treaty" appearing in the OFFICIAL GAZETTE of July 15, 1980.

Note that since August 1, 1979 certain fees for the processing of International Applications have been increased. The current schedule of fees is as follows:

Transmittal fee	$35.00
Search fee	300.00
Basic fee (first 30 pages)	190.00
Basic fee supplement (each sheet over 30)	3.50
Designation fee	45.00

SIDNEY A. DIAMOND,
Commissioner of Patents and Trademarks.

June 17, 1980.

Patent Suits

Notices under 35 USC 290; Patent Act of 1952

2,859,949, J. Willard, FORWARD DISCHARGING TRANSIT CONCRETE MIXER, **filed** Nov. 5, 1979, D.C., E.D. Wis. (Milwaukee), Doc. 79–939, *R. W. Sims et al.* v. *Oshkosh Corporation.* Case dismissed on Jan. 24, 1980.

3,053,132, Lee and Golner, SHOTGUN SHELL RELOADING TOOLS; **3,134,293,** Richard J. Lee, SHELL RELOADERS; **3,343,411,** Richard J. Lee, MACHINE RESTS FOR PISTOLS; **3,343,444,** Richard J. Lee, SHOTGUN SHELL RELOADING IMPLEMENTS; **3,550,482,** Richard J. Lee, INTEGRAL CHAMFERING TOOL; **3,555,641,** Richard J. Lee, TRIMMING TOOL FOR CARTRIDGE CASES; **3,555,959,** Richard J. Lee, CARTRIDGE PRIMER; **3,580,127,** Richard J. Lee, CARTRIDGE CASE RELOADING, **filed** June 16, 1977, D.C., E.D. Wis. (Milwaukee), Doc. 77–376, *Richard J. Lee* v. *Lee Custom Engineering, Inc.* Case dismissed on Apr. 14, 1980.

3,134,293. (See 3,053,132.)

3,181,205, Frommelt and Frommelt, PAD STRUCTURES, **filed** Aug. 8, 1980, D.C., N.D.N.Y. (Utica), Doc. 80–CV–652, *Frommelt Industries, Inc.* v. *W. B. McGuire Co., Inc.*

3,211,615, Pfizer Pharmaceuticals, Inc., ORAL ANTIDIABETIC COMPOSITION AND METHOD OF USE; **3,349,124,** same, ANTIDIABETIC AGENT, **filed** Aug. 7, 1980, D.C.N.J. (Newark), Doc. 80–2495, *Premo Pharmaceuticals, Inc.* v. *Pfizer Pharmaceuticals, Inc.*

3,211,709, Adamek, Dudley and Woodhams, SULFUR-VULCANIZABLE INTERPOLYMERS OF AT LEAST TWO ALPHA-OLEFINS AND AN UNSATURATED BRIDGED-RING HYDROCARBON, **filed** Nov. 17, 1967, D.C. Del. (Wilmington), Doc. 3439, *Hercules Incorporated* v. *Enjay Chemical Company.* Order amending order of July 29, 1980 filed on Aug. 19, 1980.

3,236,709, Bandag Incorporated, TIRE RECAPPING PROCESS, **filed** Aug. 6, 1980, D.C., W.D.N.C. (Statesville), Doc. ST–C–80–33, *Bandag Incorporated* v. *Gerrard Tire Company, Inc.*

3,241,716, Eugene A. Wahl, GRAVIMETRIC BELT FEEDER, **filed** Aug. 26, 1980, D.C.N.J. (Newark), Doc. 80–2830, *Eugene A. Wahl et al.* v. *Metalfab, Inc. et al.*

3,263,500, Bendix Corp., ENGINE STARTER GEARING; **Reg. No. 715,739** (POSITORK), Facet Enterprises Inc., **filed** Aug. 12, 1980, D.C., N.D. Ill. (Chicago), Doc. 80c4279, *Facet Enterprises Inc.* v. *American Starter Drive Service Inc.*

3,316,744, ETC Incorporated, IMPACT CRIMPING TOOL, **filed** July 30, 1980, D.C., N.D. Ohio (Cleveland), Doc. C–80–1352, *ETC Incorporated* v. *Bares Co.*

3,319,734, George M. Pavey, ELASTIC DETECTION STREAMER DEAD SECTION FOR A WATER BORNE SEISMIC SURVEYING SYSTEM, **filed** Apr. 23, 1979, D.C., S.D. Tex. (Houston), Doc. H–79–783, *Whitehall Corporation* v. *Western Geophysical Co. of America.*

3,343,411. (See 3,053,132.)

3,343,444. (See 3,053,132.)

3,349,124. (See 3,211,615.)

3,388,859, Kienzle Apparate GmbH, TAXI METER; **3,764,782,** same, TAXI METER WITH ELECTRONIC FARE COMPUTER; **3,843,869,** Geecen Limited, TAXIMETERS, **filed** Aug. 21, 1980, D.C., S.D.N.Y., Doc. 80–C–4832 MP, *Kienzle Apparate GmbH* v. *Viking Taximeter Inc. et al.*

3,395,270, Jack B. Speller, RELATIVISTIC INERTIAL REFERENCE DEVICE. **filed** July 21, 1980, D.C. Minn. (Minneapolis), Doc. 4–80–C–393, *Honeywell Inc.* v. *Jack B. Speller.*

3,411,548, Sulzer Brothers, Ltd., WEFT THREAD SUPPLY APPARATUS FOR GRIPPER SHUTTLE LOOMS, **filed** Jan. 15, 1980, D.C., S.D.N.Y., Doc. 80–C–0283, *Savio & C.S.p.A.* v. *Sulzer Brothers, Ltd.*

3,425,779, Schub, Kennedy and Fisher, PRESSURIZED MARKING INSTRUMENT, **filed** Aug. 19, 1980, D.C., N.D. Ill. (Chicago), Doc. 80c4415, *Paul C. Fisher* v. *The Gillette Company.*

3,476,382, AM International, Inc., PHOTOELECTROSTATIC COPYING MACHINE; **3,598,580,** same, PHOTOELECTROSTATIC COPYING PROCESS EMPLOYING ORGANIC PHOTOCONDUCTORS; **3,606,532,** same, PHOTOELECTROSTATIC DUPLICATOR; **3,838,921,** same, PHOTOELECTROSTATIC COPYING APPARATUS, **filed** July 30, 1980, D.C., N.D. Ill. (Chicago), Doc. 80c4016, *AM International, Inc.* v. *Eastman Kodak Co.*

3,491,500, Billy K. Watkins, POWER STOPPER WEIGHT TRANSFER APPARATUS, **filed** Sept. 13, 1977, D.C., M.D. Pa. (Scranton), Doc. 77–846, *Billy K. Watkins* v. *Franklin County Tractor et al.* Order of dismissal without costs and without prejudice filed Aug. 25, 1980.

3,492,748, Armand D. Swenson, PISTOL SAFETY MECHANISM ADAPTED FOR RIGHT OR LEFT HAND OPERATION, **filed** Sept. 3, 1980, D.C., S.D. Tex. (Houston), Doc. H–80–1986, *Herman W. Mueschke, doing business as Mueschke Manufacturing* v. *Armand D. Swenson, doing business as Swenson's 45 Shop.*

3,543,073, Edward E. Sheldon, VACUUM TUBES OF TELEVISION TYPE FOR X-RAY PROTECTION; **3,610,994,** same, IMPROVEMENTS IN CATHODE-RAY TUBES OF TELEVISION TYPE FOR X-RAYS PROTECTION. **filed** May 8, 1980, D.C., S.D.N.Y., Doc. 80–C–2654, *Asahi Glass Co., Ltd.* v. *Edward E. Sheldon.*

3,550,482. (See 3,053,132.)

3,555,641. (See 3,053,132.)

3,555,959. (See 3,053,132.)

3,580,127. (See 3,053,132.)

3,592,682, CPS Industries, Inc., WATER ACTIVATED ADHESIVE RIBBON, **filed** Sept. 2, 1980, D.C., N.D. Ill. (Chicago), Doc. 80c4686, *CPS Industries, Inc.* v. *Hallmark Cards, Incorporated.*

3,598,580. (See 3,476,382.)

3,606,532. (See 3,476,382.)

3,610,799, Allen Organ Company, MULTIPLEXING SYSTEM FOR SELECTION OF NOTES AND VOICES IN AN ELECTRONIC MUSICAL INSTRUMENT; **3,610,866,** same, ADAPTIVE SUSTAIN SYSTEM FOR DIGITAL ELEC-

TRONIC ORGAN, filed Aug. 28, 1980, D.C., N.D. Ill. (Chicago), Doc. 80c4599, *Allen Organ Company* v. *Conn Keyboards, Inc.*

3,610,586. (See 3,610,799.)

3,610,994. (See 3,543,073.)

3,611,549, Diversified Manufacturing and Marketing Co., METHOD FOR FORMING HOLES IN AND INSTALLING LINES IN STRUCTURAL MEMBERS; 3,697,188, same, filed July 15, 1980, D.C., C.D. Calif. (Los Angeles), Doc. 80–03085, *Scoggins Mfg., Inc.* v. *Art Sager, doing business as Alarm Products of California.*

3,646,696, Robert Sarkisian, POSTER DISPLAY DEVICE, filed July 8, 1980, D.C., E.D. Pa. (Philadelphia), Doc. 80–2648, *Robert Sarkisian* v. *Penn-Chem Corporation.*

3,660,165, Ignatius F. Castiglia, BRACE FOR ARTICULATED LIMBS; Reg. No. 957,912 (LENOX HILL), Lenox Hill Brace Shop, Inc., filed Aug. 8, 1980, D.C., N.D. Ga. (Atlanta), Doc. C–80–1363A, *Lenox Hill Brace Shop, Inc.* v. *C. H. Martin Company et al.*

3,674,316, Robert J. De Brey, PARTICLE MONITOR, filed Aug. 15, 1980, D.C. Minn. (St. Paul). Doc. 3–80–488, *Robert J. De Brey* v. *Sears, Roebuck and Co. et al.*

3,697,188. (See 3,611,549.)

3,736,604, Robert N. Carson, FLUID FILLED MATTRESS, filed July 30, 1980, D.C., N.D. Calif. (San Francisco), Doc. C–80–3122 SAW. *Vinyl Products* v. *Michael Geraghty Assoc.*

3,764,782. (See 3,388,859.)

3,769,116, Charles A. Champeau, METHOD OF MAKING A BUILDING MATERIAL FROM WASTE STOCK FROM A PAPERMAKING PROCESS, filed Aug. 26, 1977, D.C., E.D. Wis. (Milwaukee), Doc. 77–C–547, *Charles A. Champeau* v. *Menasha Corporation.* Case dismissed on Aug. 28, 1978.

3,783,384, Keith H. Wycoff, HIGH SPEED SELECTIVE CALLING COMMUNICATION SYSTEM HAVING LOW DRAIN RECEIVER, filed Sept. 4, 1980, D.C., N.D. Ill. (Chicago), Doc. 80c4734, *Keith H. Wycoff et al.* v. *Motorola, Inc. et al.*

3,786,734, Martin Long, UNDERWATER ELECTRONIC FLASH ACTUATOR, filed Mar. 11, 1980, D.C., N.D. Calif. (San Francisco), Doc. C–80–741 RFP, *Martin Long* v. *O. H. Brigham.* Dismissal without prejudice filed Aug. 8, 1980.

3,831,502, Rengo Co. Ltd., SLITTER SCORER APPARATUS, filed Aug. 18, 1978, D.C.N.J. (Newark), Doc. 78–2000, *Rengo Co. Ltd. et al.* v. *Molins Machine Company, Inc.* Order of dismissal filed Aug. 19, 1980.

3,838,921. (See 3,476,382.)

3,842,841, United States of America, CONSTANT CURRENT POWER PACK FOR BONE HEALING AND METHOD OF USE, filed July 25, 1980, D.C. Colo. (Denver), Doc. 80–M–981, *United States of America* v. *Osteostim Division, Telectronics Proprietary Limited et al.*

3,843,869. (See 3,388,859.)

3,876,579, Rexnord Inc., COMPOSITION TO BE APPLIED TO A SURFACE TO INCREASE ITS WEAR RESISTANCE, filed Aug. 8, 1980, D.C., N.D. Ill. (Chicago), Doc. 80c4229, *Rexnord Inc.* v. *Polygem Inc.*

3,928,933, ITI Hawaii, Inc., HOLDING TOY, filed July 28, 1980, D.C., N.D. Calif. (San Francisco), Doc. C–80–3101, *ITI Hawaii, Inc.* v. *Determined Productions.*

3,949,288, Reed and Young, TELEPHONE INCORPORATING BINARY CODED DECIMAL TIME DISPLAY; Reg. No. 997,588 (BINATIME), Edgar D. Young, filed Aug. 15, 1980, D.C., S.D. Ohio (Columbus), Doc. C–2–80–699, *Edgar Dale Young* v. *Media House Corp.*

3,945,023, Honeywell, Inc., AUTO-FOCUS CAMERA WITH SOLID STATE RANGE FINDER, filed Sept. 9, 1980, D.C., N.D. Ill. (Chicago), Doc. 79c4794, *Honeywell, Inc.* v. *Canon USA, Inc. et al.*

3,958,685, Cincinnati Milacron, Inc., COUPLING FOR HANDLING WORKPIECE, CONVEYOR COMBINED THEREWITH, AND METHOD; 4,059,188, same, MANUAL PREFORM REMOVAL DEVICE; 4,062,175, same, CONVEYOR COMBINED WITH COUPLING; 4,086,999, same, CONVEYOR COMBINED WITH COUPLING FOR HANDLING WORKPIECE; 4,140,211, same, WORKPIECE LOADER WITH RESILIENT END ON FEED CHUTE; 4,185,812, same, BLOW MOLDING PALLET ASSEMBLY FOR CONVEYING ONE OR MORE WORKPIECES, filed Aug. 1, 1980, D.C., E.D. Mich. (Detroit), Doc. 80–72857, *Cincinnati Milacron, Inc.* v. *Hoover Universal, Inc.*

3,986,712, Kaiichi Hasegawa, FEEDING DEVICE FOR CARD COUNTING MACHINES, filed Aug. 13, 1980, D.C., C.D. Calif. (Los Angeles), Doc. 80–03519 IH, *Bilcon Corporation of America* v. *Abbott Coin Counter Company, Inc.*

3,995,102, Raceway Components, Inc., INSERT DEVICE FOR CABLES, filed Aug. 6, 1980, D.C., N.D. W. Va. (Parkersburg), Doc. C–80–0056–P, *Raceway Components, Inc.* v. *Walker/Parkersburg Division, Textron, Inc.*

4,016,011, Satron, Inc., WOVEN ROPE, filed Aug. 13, 1980, D.C., C.D. Calif. (Los Angeles), Doc. 80–03558 LTI (Px), *Satron, Inc.* v. *Ancra Corporation.*

4,046,923, L. D. Schreiber Cheese Co., Inc., PACKAGE WITH STAGGERED PRODUCE SLICES AND PROCESS FOR PRODUCING THE SAME, filed Sept. 6, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c3287, *L. D. Schreiber Cheese Co., Inc.* v. *Borden, Inc.* Cause dismissed without prejudice with each party to bear its own costs filed Apr. 25, 1978. Same, filed Sept. 8, 1977, D.C. Minn. (Minneapolis), Doc. 4–77–C–322, *Land O'Lakes, Inc.* v. *L. D. Schreiber Cheese Co., Inc.* Stipulation and order of dismissal filed Apr. 27, 1979.

4,046,923, L. D. Schreiber Cheese Co. Inc., PACKAGE WITH STAGGERED PRODUCE SLICES AND PROCESS FOR PRODUCING THE SAME; D. 227,852, PACKAGE WITH STAGGERED PRODUCE SLICES, filed Aug. 15, 1978, D.C., N.D. Ohio (Toledo), Doc. C–78–373, *L. D. Schreiber Cheese Co., Inc.* v. *AMFAC Foods, Inc.*

4,055,029, Collo GmbH, CLEANING, SCOURING AND/OR POLISHING PADS; 4,111,666, same, METHOD OF MAKING CLEANING, SCOURING AND/OR POLISHING PADS AND THE IMPROVED PAD PRODUCED THEREBY, filed Apr. 26, 1979, D.C., E.D. Wis. (Milwaukee), Doc. 79–286, *Fedco Foam International, Inc.* v. *S. C. Johnson & Son, Inc.* Case settled on Feb. 20, 1980.

4,059,188. (See 3,958,685.)

4,062,155, Roy A. Fricke, SPARK PLUG CLEANER, filed Oct. 26, 1979, D.C., C.D. Calif. (Los Angeles), Doc. 79–4144–HP, *Wells Mfg. Corp.* v. *The Allen Group et al.* Same, filed Sept. 4, 1980, D.C., C.D. Calif. (Los Angeles), Doc. 80–03903–R, *Roy A. Fricke et al.* v. *Sears, Roebuck & Co. et al.*

4,065,649, Carter and Quain, PRESSURE SENSITIVE MATRIX SWITCH HAVING APERTURED SPACER WITH FLEXIBLE DOUBLE SIDED ADHESIVE INTERMEDIATE AND CHANNELS OPTIONALLY INTERPOSED BETWEEN APERTURES, filed Aug. 14, 1978, D.C., E.D. Wis. (Milwaukee), Doc. 78–C–517, *Lake Center Industries* v. *W. H. Brady Co.* Case dismissed on Mar. 6, 1979.

4,077,335, Luzzani and Riva, EXTENSIBLE TABLE, filed Apr. 24, 1979, D.C., M.D.N.C. (Greensboro), Doc. C–79–272–S, *Cicci Enterprises, Inc.* v. *Bassett Mirrow Co., Inc.* Order of dismissal filed June 2 1980.

4,082,175. (See 3,958,685.)

4,086,999. (See 3,958,685.)

4,111,666. (See 4,055,029.)

4,140,211. (See 3,958,685.)

4,156,634, James R. Blasius, METHOD FOR MAKING CRUDE BORIC ACID FROM BORATE AND SULFURIC ACID, filed Aug. 13, 1980, D.C. Ariz. (Phoenix), Doc. CIV–80–656–CLH, *H. J. H. Chemicals, Inc.* v. *Superior Products Corporation of Arizona et al.*

4,175,601, Gustave C. Meyer, III, HAND-HELD WEDGE TOOL FOR SPLITTING WOOD, filed Aug. 5, 1980, D.C.N.J. (Newark), Doc. 80–2499, *Gustave C. Meyer, III* v. *Colonial Tool Co., Inc. et al.*

4,176,921, Carrera International Corporation, EYEGLASSES HAVING REMOVABLE LENSES, filed Sept. 2, 1980, D.C., S.D.N.Y., Doc. 80–C–5000 EW, *Carrera International Corporation* v. *Hudson Optical Corporation.*

4,185,812. (See 3,958,685.)

4,191,376, Systems Operations, Inc., HIGHLY SECURE PLAYING CARDS FOR INSTANT LOTTERY AND GAMES, filed June 12, 1980, D.C.N.H. (Concord), Doc. 80–274, *Scientific Games Development Corporation (1973)* v. *Systems Op-*

erations, Inc. Case voluntarily dismissed pursuant to judgment entered Aug. 15, 1980.

Re. 28,559, John A. Villano. METHOD FOR MILLING CAMS FOR SWISS-TYPE SCREW MACHINES; **Re. 28,766,** same, APPARATUS FOR MILLING CAMS AND THE LIKE, AS FOR SWISS-TYPE SCREW MACHINE CAMS, **filed** Sept. 5, 1980, D.C.N.J. (Newark), Doc. 80–2885. *Cam-Apt, Inc. and John A. Villano* v. *Macor S.A. and Cosa Corporation.*

Re. 28,766. (See Re. 28,559.)

D. 227,352. (See 4,046,923.)

D. 234,277, Salmon and Hamilton, STOOL, **filed** July 12. 1977, D.C., E.D. Wis. (Milwaukee), Doc. 77–436, *Innovative Metal, Inc.* v. *Britt Industries, Inc. et al.* Injunction filed Apr. 25, 1980.

D. 234,606, Paccar. Inc.. TRUCK CAB, **filed** Aug. 8, 1979, D.C., N.D. Ohio (Cleveland). Doc. C–79–1541. *Paccar, Inc.* v. *Triple "T" Mfg.. Inc.* Consent decree and final judgment in favor of plaintiff filed on July 21. 1980.

PP 2,816, Van Well Nursery, Inc., APPLE TREE, **filed** Nov. 30. 1979. D.C., E.D. Wash. (Spokane). Doc. C–79–410. *Van Well Nursery, Inc.* v. *Dean Welch et al.* Consent decree with permanent injunction and order of dismissal filed Aug. 4. 1980.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,667,170, Re. S.N. 162,697, Filed Jun. 24, 1980, Cl. 51/389, FINISHING ARTICLE AND SUPPORT MEMBER THEREFOR, Joseph H. Mackay, Jr., Owner of Record: *Standard Abrasives, Inc., Northridge, Calif.,* Attorney or Agent: Byard G. Nilsson, et al., Ex. Gp.: 323

3,699,814, Re. S.N. 177,792, Filed Aug. 13, 1980, Cl. 73/421.5 R, GAS SAMPLER, Warren F. Kaufman, Owner of Record: *Philco-Ford Corporation, Philadelphia, Pa.,* Attorney or Agent: Cyrus G. Minkler, et al., Ex. Gp.: 244

3,810,274, Re. S.N. 172,255, Filed Jul. 25, 1980, Cl. 16/169, PIVOT AND GUIDE ROD ASSEMBLY FOR BI-FOLD DOOR, Ralph E. Ford, et al., Owner of Record: *Slimfold Manufacturing Company, Inc., Dothan, Ala.,* Attorney or Agent: Harold D. Jones, Jr., et al., Ex. Gp.: 353

4,065,078, Re. S.N. 172,702, Filed Jul. 28, 1980, Cl. 244/104 FP, AIRCRAFT UNDERCARRIAGE SUSPENSION, Stanley F. N. Jenkins, et al., Owner of Record: *Automotive Products Limited, Leamington Spa, England,* Attorney or Agent: Solon B. Kemon, et al., Ex. Gp.: 315

4,154,813, Re. S.N. 162,102, Filed Jun. 23, 1980, Cl. 424/48, MEANS AND METHOD FOR IMPROVING NATURAL DEFENSES AGAINST CARIES, Israel Kleinberg, Owner of Record: *Inventor,* Attorney or Agent: None, Ex. Gp.: 125

4,173,908, Re. S.N. 173,826, Filed Jul. 30, 1980, Cl. 76/25 A, SAW CHAIN SHARPENING FIXTURE, Frank J. Aksamit, Owner of Record: *Pro-Sharp Corporation, Newington, Conn.,* Attorney or Agent: John M. Prutzman, Ex. Gp.: 323

4,203,341, Re. S.N. 172,564, Filed Jul. 28, 1980, Cl. 84/255, DAMPER ASSEMBLY OF PIANOS, Hiroyoshi Takahashi, Owner of Record: *Nippon Gabbi Siezo, Kafueshiki Kaisha, Shezuoka-Ken, Japan,* Attorney or Agent: Robert C. Faber, et al., Ex. Gp.: 211

PATENT NOTICES

Certificates of Correction for the Week of Nov. 4, 1980

Re. 30,195	4,193,914	4,205,199	4,211,608
3,730,310	4,194,909	4,205,237	4,211,658
3,757,294	4,194,965	4,205,275	4,211,662
3,767,706	4,195,329	4,205,356	4,211,970
3,946,358	4,195,476	4,205,455	4,212,008
3,947,764	4,195,805	4,205,610	4,212,061
3,988,092	4,195,919	4,205,702	4,212,137
3,988,246	4,197,316	4,206,342	4,212,145
4,003,651	4,198,268	4,206,457	4,212,430
4,032,412	4,198,400	4,206,639	4,212,438
4,050,344	4,198,424	4,207,013	4,212,451
4,064,687	4,198,773	4,207,133	4,212,470
4,070,526	4,198,800	4,207,288	4,212,586
4,071,949	4,199,602	4,207,310	4,212,698
4,077,909	4,199,841	4,207,407	4,213,112
4,079,037	4,200,578	4,207,502	4,213,427
4,088,669	4,200,609	4,207,580	4,213,449
4,101,487	4,200,673	4,207,792	4,213,724
4,126,911	4,200,688	4,207,952	4,213,794
4,129,724	4,200,726	4,208,249	4,213,826
4,129,803	4,200,729	4,208,267	4,213,860
4,143,863	4,200,999	4,208,399	4,214,408
4,150,202	4,201,023	4,208,431	4,214,510
4,154,022	4,201,095	4,208,493	4,214,575
4,169,016	4,201,541	4,208,739	4,214,580
4,172,724	4,201,673	4,209,310	4,214,588
4,175,064	4,201,795	4,209,353	4,214,624
4,176,006	4,202,229	4,209,371	4,214,763
4,176,021	4,202,490	4,209,418	4,214,895
4,177,142	4,202,493	4,209,827	4,214,933
4,178,752	4,202,717	4,210,058	4,215,319
4,179,661	4,202,891	4,210,174	4,215,351
4,180,568	4,203,346	4,210,241	4,215,467
4,183,386	4,203,533	4,210,515	4,215,492
4,183,795	4,204,145	4,210,726	4,215,535
4,184,019	4,204,242	4,210,782	4,215,972
4,187,405	4,204,251	4,211,007	4,216,248
4,188,198	4,204,741	4,211,051	4,216,427
4,188,282	4,204,846	4,211,091	4,216,930
4,189,214	4,204,849	4,211,098	4,217,137
4,190,451	4,205,162	4,211,232	4,217,348
		4,211,320	4,218,699

Patents Available for Licensing or Sale

3,666,352. RATE CONTROLLED PHOTOCHROME LENSES OF VINYL CHLORIDE-VINYL ACETATE CO-POLYMER CONTAINING A MERCURY THIOCARBAZONE COMPOUND. Charles A. Wagner, 6679 Hawkeye Run, Columbia, Md. 21044.

3,965,498. FOLDING BED ASSEMBLY. Miklos Boni. P.O. Box 7872, Van Nuys, Calif. 91409.

4,184,779. STIRRING DEVICE. Charles Detmer, Route 2, Troy, Mo. 63379.

4,185,826. CIRCULAR BUTTERFLY. Ming-Shean Ueng. 2304 5th St., #225, Lubbock, Tex. 79401.

4,192,332. VERTICAL LIQUID STORAGE TANK AND APPARATUS FOR CLEANING. Robert H. Feldmeier. Correspondence to: James Magee, Jr., 5 Marston Drive, Morris Plains, N.J. 07950.

4,202,130. SAFETYSHIP. Terry Smith, 124 McKiernan, Folsom, Calif. 95630.

Otis Engineering Corporation is prepared to grant licenses under the following patents upon reasonable terms. Address inquiries to: Patent Attorney, Otis Engineering Corporation, P.O. Box 34380, Dallas, Tex. 75234. Telephone (214) 323–3882.

3,756,260. VALVES.

4,162,713. PLANETARY TRANSMISSION WITH HYDRAULIC ENGAGEMENT AND DISENGAGEMENT.

4,175,987. LOW ALLOY TEMPERED MARTENSITIC STEEL.

General Electric Company withdraws the following patent from the list of patents published as available for licensing in 946 O.G. 945 (May 18, 1976).

3,739,840. HEAT EXCHANGER HAVING RESILIENTLY MOUNTED TUBULAR MEMBERS.

The General Electric Company is prepared to grant non-exclusive licenses under the following patents upon reasonable terms to domestic manufacturers.

Applications for license may be addressed to: Patent Counsel, Turbine Operations, Turbine Patent Operation, General Electric Company, 1 River Road, Bldg. 18A–5th Floor, Schenectady, N.Y. 12345.

4,164,126. SELF-REGULATING TRANSPORT MECHANISM FOR SUPERCONDUCTIVE ROTOR REFRIGERANT.

4,164,671. RESISTOR-CONTAINING CRYOGENIC CURRENT LEAD.

The RCA Corporation offers to grant non-exclusive licenses on reasonable terms and conditions under the patents listed below. Inquiries respecting licenses under RCA patents should be addressed to: RCA Corporation, Sr. Vice President, Licensing, 30 Rockefeller Plaza, New York, N.Y. 10020.

D. 256,117. VIDEO DISC PLAYER.

4,210,988. METHOD FOR MAKING AN INDIRECTLY-HEATED CATHODE ASSEMBLY.

4,211,182. DIFFUSION APPARATUS.

4,211,421. VIDEO DISC PLAYER HAVING ADJUSTABLE END-OF-PLAY SWITCH.

4,211,488. OPTICAL TESTING OF A SEMICONDUCTOR.

4,211,489. PHOTOMASK ALIGNMENT SYSTEM.

4,211,563. AQUEOUS PHOTORESIST OF CASEIN AND N-METHYLOL ACRYLAMIDE.

4,211,936. CCD GATE ELECTRODE STRUCTURES AND SYSTEMS EMPLOYING THE SAME.

4,211,941. INTEGRATED CIRCUITRY INCLUDING LOW-LEAKAGE CAPACITANCE.

4,212,008. CIRCUIT FOR DISPLAYING CHARACTERS ON LIMITED BANDWIDTH, RASTER SCANNED DISPLAY.

4,212,032. SYNCHRONIZATION AND GAIN CONTROL CIRCUIT.

4,212,422. WEB POSITION CONTROLLER FOR WEB TRANSPORT SYSTEMS.

4,212,540. TESTING THE DIVERGENCE OF A BEAM FROM A LASER.

4,213,068. TRANSISTOR SATURATION CONTROL.

4,213,088. VOLTAGE MEASURING CIRCUIT.

4,213,096. PHASELOCK RECEIVER WITH PHASELOCK DETECTOR.

4,213,148. RECORDING/PLAYBACK APPARATUS USING A SINGLE PILOT TONE FOR ACTIVE TRACKING AND CONTROL OF A VIDEO DISC PICKUP DEVICE.

4,213,151. AGC KEYING SIGNAL CIRCUIT.

4,213,663. WET CARBON-DIOXIDE TREATMENT OF PARTIALLY-COMPLETED CRT.

4,213,673. PROJECTOR FOR READING OUT COLOR-ENCODED FOCUSED IMAGE HOLOGRAMS EMPLOYING AN OPTIMUM ENCODING SCHEME.

4,213,798. TELLURIUM SCHOTTKY BARRIER CONTACT FOR AMORPHOUS SILICON SOLAR CELLS.

4,213,807. METHOD OF FABRICATING SEMICONDUCTOR DEVICES.

4,214,018. METHOD FOR MAKING ADHERENT PINHOLE FREE ALUMINUM FILMS ON PYROELECTRIC AND/OR PIEZOELECTRIC SUBSTRATES.

4,214,067. SEALING COMPOSITION.

4,214,126. CADENCE SUPPRESSION SYSTEM.

4,214,189. REGULATED DEFLECTION CIRCUIT.

4,214,213. SIGNAL SELECTING SYSTEM.

4,214,255. GATE TURN-OFF TRIAC WITH DUAL LOW CONDUCTIVITY REGIONS CONTACTING CENTRAL GATE REGION.

4,214,261. SYNCHRONIZING APPARATUS FOR REMOTE TELEVISION APPARATUS.

4,214,550. APPARATUS FOR THE DEPOSITION OF A MATERIAL FROM A LIQUID PHASE.

4,214,798. METHOD FOR SPOT-KNOCKING THE ELECTRON-GUN MOUNT ASSEMBLY OF A CRT.

4,215,025. WATER SOLUBLE ADHESIVE COATING FOR MOUNTING COMPONENTS TO PRINTED WIRING BOARDS.

4,215,185. LIQUID JUNCTION SCHOTTKY BARRIER SOLAR CELL.

4,215,293. CADENCE SCANNED FLAT IMAGE DISPLAY DEVICE.

4,215,319. SINGLE FILAMENT SEMICONDUCTOR LASER.

4,215,368. MEMORY ADDRESSING SYSTEM FOR AUTOMATIC SETUP TV CAMERA SYSTEM.

National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

Notice of Availability for Licensing

The inventions listed below are owned by the U.S. Government and are available for domestic and possibly foreign licensing in accordance with the licensing policies of the agency-sponsors.

Copies of patents cited are available from the Commissioner of Patents and Trademarks Washington, D.C. 20231, for $.50 each. Requests for copies of patents must include the patent number.

Copies of patent applications cited are available from the National Technical Information Service (NTIS), Springfield, Va. 22161, for $5.00 each ($10.00 outside North American Continent). Requests for copies of patent applications must include the patent application number. Claims are deleted from patent application copies sold to avoid premature disclosures. Claims and other technical data will usually be made available to serious prospective licensees upon execution of a non-disclosure agreement.

Requests for information on the licensing of particular inventions should be directed to the addresses cited for the agency-sponsors.

DOUGLAS J. CAMPION,
Program Coordinator,
Office of Government Inventions and Patents,
National Technical Information Service,
U.S. Department of Commerce.

U.S. DEPARTMENT OF AGRICULTURE

Program Agreements and Patent Branch, Administrative Service Division, Federal Bldg., Science and Education Administration, Hyattsville, Md. 20782

Patent application 6–132,595. Ketose Sugars. Filed Mar. 21, 1980.

Patent application 6–135,850. Carbon Dioxide Analyzer for Greenhouses. Filed Mar. 31, 1980.

Patent 4,186,608. Method and Apparatus for Verifying Declared Contents of Contents of Certain Solids. Filed July 17, 1978. Patented Feb. 5, 1980. Not available NTIS.

Patent 4,196,149. Ternary Salts of Tris(aminomethyl) phosphines and Their Oxides. Filed Nov. 29, 1978. Patented Apr. 1, 1980. Not available NTIS.

Patent 4,204,859. Method of Increasing the Yield of Hydrocarbons From Plants. Filed Mar. 31, 1978. Patented May 27, 1980. Not available NTIS.

Patent 4,206,133. Apparatus for Fermenting Liquids. Filed Apr. 26, 1978. Patented May 27, 1980. Not available NTIS.

U.S. DEPARTMENT OF ENERGY

Assistant General Counsel for Patents
Washington, D.C. 20545

Patent application 6–015,256. Solar Tracking Apparatus. Filed Feb. 26, 1979.

Patent application 6–015,257. Reactor and Method for Hydrocracking Carbonaceous Material. Filed Feb. 26, 1979.

Patent application 6–015,258. Process for Hydrocracking Carbonaceous Material to Provide Fuels or Chemical Feed Stock. Filed Feb. 26, 1979.

Patent application 6–016,037. Method of Controlling Switching of a Multiphase Inductor-Converter Bridge. Filed Feb. 28, 1979.

Patent application 6–017,299. Coal Liquefaction in an Inorganic-Organic Medium. Filed Mar. 5, 1979.

Patent application 6–025,629. Method of Preparing Porous, Rigid Ceramic Separators for an Electrochemical Cell. Filed Mar. 30, 1979.

Patent application 6–029,963. Process for Hydrocracking Carbonaceous Material in Liquid Carrier. Filed Apr. 13, 1979.

Patent application 6–039,986. Novel Fischer-Tropsch Catalysts. Filed May 17, 1979.

Patent application 6–052,716. Trace Desulfurization. Filed June 27, 1979.

Patent 4–085,590. Hydride Compressor. Filed Jan. 5, 1976. Patented Apr. 25, 1978. Not available NTIS.

Patent 4,172,236. Loss-Free Method of Charging Accumulator Rings. Filed June 16, 1978. Patented Oct. 23, 1979. Not available NTIS.

Patent 4,174,190. Annular Linear Induction Pump With an Externally Supported Duct. Filed June 30, 1977. Patented Nov. 13, 1979. Not available NTIS.

Patent 4,176,093. Neutron Absorbing Room Temperature Vulcanizable Silicone Rubber Compositions. Filed Feb. 22, 1977. Patented Nov. 27, 1979. Not available NTIS.

Patent 4,180,736. Use of a Large Time-Compensated Scintillation Detector in Neutron Time-of-Flight Measurements. Filed Sept. 25, 1978. Patented Dec. 25, 1979. Not available NTIS.

U.S. DEPARTMENT OF TRANSPORTATION

Patent Counsel, 400 7th St., SW., Washington, D.C. 20590

Patent application 6–158,907. Hand-Held Railroad Data Acquisition System. Filed June 12, 1980.

U.S. DEPARTMENT OF THE NAVY

Assistant Chief for Patents, Office of Naval Research
Code 302, Arlington, Va. 22217

Patent application 6–125,004. Seal for Situ Replacement on a Rotatable Shaft. Filed Feb. 27, 1980.

U.S. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Assistant General Counsel for Patent Matters—NASA
Code GP–2, Washington, D.C. 20546

Patent application 6–145,207. Potential Heat Exchange Fluids for Use in Sulfuric Acid Vaporizers. Filed Apr. 30, 1980.

Patent 4,198,792. Chelate-Modified Polymers for Atmospheric Gas Chromatography. Filed June 30, 1978. Patented Apr. 22, 1980. Not available NTIS.

Patent 4,199,448. Reverse Osmosis Membrane of High Urea Rejection Properties. Filed June 9, 1976. Patented Apr. 22, 1980. Not available NTIS.

U.S. DEPARTMENT OF AGRICULTURE

Program Agreements and Patent Branch, Administration Service Division, Federal Bldg., Science and Education Administration, Hyattsville, Md. 20782

Patent application 6–034,877. Tris(N-carbalkoxylaminomethyl)phosphine Oxides and Sulfides. Filed Apr. 30, 1979.

Patent application 6–098,459. Quarternary Ureidomethyl Phosphonium Salts. Filed Nov. 29, 1979.

Patent application 6–118,948. Improved Abrasion Resistance and Strength of Cotton-Containing Fabric Made Resilient With N-Methylolacrylamide-Type Reagent. Filed Feb. 6, 1980.

Patent application 6–118,949. Process for Producing Durable-Press Cotton Fabrics With Improved Balances of Textile Properties. Filed Feb. 5, 1980.

Patent application 6–132,589. Method of Decontaminating Waste Liquors. Filed Mar. 21, 1980.

Patent 4,200,639. Sesbanine and the Use Thereof in Treating Leukemic Tumors. Filed Mar. 29, 1979. Patented Apr. 29, 1980. Not available NTIS.

Patent 4,203,996. Synthetic Cephalotaxine Esters Having Antileukemic P388 Activity. Filed Jan. 3, 1979. Patented May 20, 1980.

Patent 4,204,072. Tris(N-carbalkoxylaminomethyl)-Phosphines. Filed Nov. 29, 1978. Patented May 20, 1980. Not available NTIS.

Patent 4,206,221. Cephalomannine and Its Use in Treating Leukemic Tumors. Filed Jan. 3, 1979. Patented June 3, 1980. Not available NTIS.

U.S. DEPARTMENT OF TRANSPORTATION

Patent Counsel, 400 7th St., SW., Washington, D.C. 20590

Patent 4,205,553. Automated Gain Control in Rail Flaw Detection. Filed Feb. 21, 1979. Patented June 3, 1980. Not available NTIS.

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The libraries listed herein, designated as patent depository libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent months or years in some libraries to all or most of the patents issued since 1870, or earlier, in other libraries.

These patent collections are open to public use and each of the patent depository libraries, in addition, offers the publications of the patent classification system (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Depending upon the library, the patents may be available in microfilm, in bound volumes of paper copies, or in some combination of both. Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the patent depository libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Birmingham Public Library	(205) 254-2555
California	Los Angeles Public Library	(213) 626-7555 Ext. 274
	Sacramento: California State Library	(916) 322-4572
	Sunnyvale: Patent Information Clearinghouse*	(408) 738-5580
Colorado	Denver Public Library	(303) 573-5152 Ext. 223
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4519
Illinois	Chicago Public Library	(312) 269-2814
Massachusetts	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Detroit Public Library	(313) 833-1458
Minnesota	Minneapolis Public Library & Information Center	(612) 372-6552
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 214
Nebraska	Lincoln: University of Nebraska-Lincoln, Love Library	(402) 472-3411
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7740
New York	Albany: New York State Library	(518) 474-5125
	Buffalo and Erie County Public Library	(716) 856-7525 Ext. 267
	New York Public Library (The Research Libraries)	(212) 790-6291
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Public Library of Cincinnati & Hamilton County	(513) 369-6936
	Cleveland Public Library	(216) 623-2932
	Columbus: Ohio State University Libraries	(614) 422-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Pennsylvania	Philadelphia: Franklin Institute Library	(215) 448-1224**
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-7722 Ext. 224
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 528-2957
Texas	Dallas Public Library	(214) 748-9071
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Engineering Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3043

*Collection organized by subject matter.

**Call only between the hours of 12 o'clock noon and 5 :00 p.m.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF SEPTEMBER 6, 1980

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—D. E. TALBERT, Director Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metallurgical Apparatus; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	10-25-79
GENERAL ORGANIC CHEMISTRY, GROUP 120—C. E. VAN HORN, Director Heterocyclic Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	5-11-79
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—J. O. THOMAS, JR., Director Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins with Natural Polymers and Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g., Coating; Molding; Ink; Prosthodontics; Adhesive and Abrading Compositions; Molding, Shaping, Treating Process, and Apparatus Therefor; Irradiation (Part); Bleaching; Dyeing; Leather, Fur and Textile Treating Compositions.	5-7-79
COATING, LAMINATING AND PHOTOGRAPHY, GROUP 160—S. N. ZAHARNA, Director Coating: Processes, Apparatus and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; and Photography.	11-27-79
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—R. F. WHITE, Director Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	7-11-79
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—Vacant Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Horology; Acoustics; Recorders; Weighing Scales.	12-11-78
SPECIAL LAWS ADMINISTRATION, GROUP 220—Vacant Ordnance, Firearms and Ammunition; Lubrication; Illumination; Nuclear Reactors; Acoustics, Communications, Optics; Radar; Directional Radio; Torpedoes; Seismic Exploring; Cathode Ray Tube Circuitry; Cryptography; Laser Devices; Radioactive Materials; Powder Metallurgy; Rocket Fuels; Special, Fuel, Explosive and Thermic Compositions; Thermal and Photoelectric Batteries.	4-16-79
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—Vacant Communications; Multiplexing Techniques; Television; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	8-13-79
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—A. L. SMITH, Director Receptacles; Bearings; Joint Packing; Conduits; Switches; Presses; Plumbing Fixtures; Textile Spinning; Cleaning; Food Treating; Agitating; Centrifugal Separating; Geometrical Instruments; Sound Recording; Image Projectors; Web Feeding; Winding and Reeling; Cable Hoists; Measuring and Testing; Indicating; Fluent Material Handling.	1-22-79
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—S. S. MATTHEWS, Director Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	11-30-78
DESIGNS, GROUP 290—Vacant Industrial Arts; Household, Personal and Fine Arts.	10-10-78
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	7-2-79
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—M. M. NEWMAN, Director Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion-Bonding, Metal Founding; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks; Fishing, Etc.; Butchering; and Books and Printed Matter.	6-4-79
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—R. E. AEGERTER, Director Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Plants; Harvesting; Earth Working and Excavating; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Information Dissemination.	7-30-80
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—D. J. STOCKING, Director Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Couplings; Gearing; Fluid Handling and Control; Lubrication.	4-24-79
GENERAL CONSTRUCTIONS, TEXTILES, MINING AND GEARING, GROUP 350—G. M. FORLENZA, Director Building Structures; Racks; Cabinets; Closures; Supports; Furniture; Fasteners; Locks; Pipe Couplings; Joints; Misc. Hardware; Textiles; Sewing Machines; Apparel; Footwear; Earth Engineering; Earth Drilling; Mining; Wells; Roads; Bridges; Tool Driving; Gearing; Machine Elements; Clutches.	3-19-79

Expiration of patents: The patents within the range of numbers indicated below expire during September 1980, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,102,270 to 3,105,236, inclusive
Plant Patents ..... Numbers 2,277 to 2,286, inclusive

XEROX LICENSE OFFER

This notice is published pursuant to a CONSENT ORDER TO CEASE AND DESIST dated July 29, 1975 between Xerox Corporation and the Federal Trade Commission.

TERMS *contained in this notice are defined in the Consent Order. All interested parties should refer to that document for the definitions and additional details of Xerox' patent and know-how licensing obligations thereunder.* A copy of the Consent Order and a list of PATENTS licensed to Xerox which are subject to the provisions of paragraphs II and IV (C) (9) of the Order, if any, are available from Xerox upon written request. All such requests and any request relating to the licensing of PATENTS and the licensing and disclosure of KNOW-HOW pursuant to the Consent Order should be made in writing and addressed to:

The Manager of Patent Licensing
Xerox Corporation
Stamford, Connecticut 06904

Xerox shall in accordance with the terms of the Consent Order:

(1) Grant licenses under
   (a) its ORDER PATENTS to make, have made, use and vend OFFICE COPIER PRODUCTS under the terms of the Consent Order, and
   (b) patents which are required to be licensed pursuant to the terms of paragraph X of the Consent Order, if any, and

(2) Disclose certain written materials as provided in the Consent Order [KNOW-HOW] to any LICENSEE of its United States ORDER PATENTS for use in connection with the manufacture of OFFICE COPIER PRODUCTS in the United States upon payment of the cost of collection and duplication of the requested materials.

The following is a list of patents which is believed to include all of the PATENTS available for licensing in accordance with the terms of the Consent Order. Fuji Xerox, Ltd. patents which also make up part of the list are grouped separately. There also follows a classification index for use in conjunction with the classification data appearing in the patent list to identify the category of the patent and a schedule of foreign countries and their corresponding key letters which are used in identifying corresponding foreign patents in the list. Since the classification system is not restricted solely to OFFICE COPIER PRODUCTS there are several patents included in the list to which the Consent Order is not applicable.

LIST CLASSIFICATION

The Patents are listed in numerical order according to their class assignment. For example, all U.S. patents classified as 1(A) appear at the beginning followed by those classified as 1A1, 1A1A, 1A1B, etc. The left-hand column shows the U.S. patent number. To the right of the U.S. patent number is its title followed by its issue date. Following the U.S. patent issue date is a list of the foreign patents based on the U.S. patents. An example of how the list should be used is as follows:

Under Class 1A which is entitled "Electrostatographic Systems, Imaging Systems—Distinctive Photosensitive Members Imaged", two U.S. patents are listed—2,573,881 which issued November 6, 1951 with corresponding patents in Australia, Canada, Germany, Great Britain, Switzerland and Sweden, and 3,877,936 which issued April 15, 1975 with a corresponding patent in Belgium.

XEROX PATENT CLASSIFICATION INDEX

TABLE OF CONTENTS

1. Electrostatographic Systems
2. Distinctive Photosensitive Members
3. Charging Systems
4. Optical Image Formation and Projection
5. Latent Image Development Systems and Compositions
6. Copy Substrate Handling Systems
7. Developed Image Transfer & Display
8. Image Fixing Systems
9. Cleaning of Imaging Surface
10. Document Handling
12. Photoelectrophoresis
15. Imaging Systems Other Than Electrostatographic
17. Optical Systems
18. Chemical Compositions & Preparation Thereof
20. Mechanical Components
21. Metal Working, Forming and Treating
24. Graphic Arts
25. Electronic Components
26. Design Patents
27. Photography
30. Manifold
31. Migration Imaging (XDM)
32. Miscellaneous

XEROX PATENT CLASSIFICATION INDEX

TABLE OF CONTENTS

TABLE OF CONTENTS

1. ELECTROSTATOGRAPHIC SYSTEMS
   - A. Imaging Systems—Distinctive Photosensitive Members Imaged
     1. Inorganic Photosensitive Members
        - a. Selenium
        - b. Alloys of Selenium
        - c. Zinc or Cadmium Chalcogenides
        - d. PbO in Binder
        - e. Group IIIa Phosphides
        - f. Photosensitive Glass, Glass Binders and Ceramics
     2. Organic Photosensitive Members
        - a. Organic Photoconductor in Binder
        - b. Charge Transfer Complexes
        - c. Photochromic Compounds
        - d. Photopolymerizable Compounds
     3. Photosensitive Members with Subadjacent Barrier Layer
     4. Photosensitive Members with Protective Overlayer
     5. Fibrous Photosensitive Members
     6. Multilayered Members (Support-Intermediate Layer-Photoconductor)
   - B. Imaging Systems—Imaged Non-Photosensitive Members
     1. Non-Photosensitive Members
     2. Induction Imaging Systems
     3. Xeroprinting Systems
     4. TESI Printing Systems
        - a. Method
        - b. Apparatus
   - C. Imaging Systems with Variation in Final Copy
     1. Imaging Systems with Size Reduction
     2. Imaging Systems with Enlargement
     3. Half-tone Imaging Systems
     4. Deformation Imaging Systems
        - a. Frost
        - b. Relief
     5. Reversal Printing Systems
   - D. Duplex Imaging Systems
   - E. Color Xerographic Systems
   - F. Imaging Systems for Preparing Duplicating Masters
   - G. Imaging Systems—Distinctive Development Systems
     1. Magnetic Recording Systems
     2. Multiple Copying Systems with Partial Transfer
     3. Imaging Systems Employing Adhesive Transfer Web
     4. Imaging Systems Employing Toner Coated Plates
     5. Imaging Systems Capable of Development in Ambient Light
     6. Imaging Systems with Liquid Polar Ink Development
   - H. Display Systems with Imaging Capability
     1. Projection of a Xerographic Image (PROXI)
     2. Pin Matrix
   - I. Imaging Systems with Image Enhancement
   - J. Electrostatographic Apparatus
     1. Total Reproduction Systems
     2. Cameras
     3. Variable Imaging Speed
     4. Moving Document Reproduction
     5. Flat Plate Electrostatographic Apparatus
     6. Flexible Electrostatographic Apparatus
     7. Count Control Apparatus
     8. Developer Dispensing and Control Apparatus
   - K. Miscellaneous Methods and Apparatus
     1. Electrometers
     2. Reflex Imaging Systems
     3. Resist Formation System

2. DISTINCTIVE PHOTOSENSITIVE MEMBERS
   - A. Photosensitive Members—Novel Compositions
     1. Inorganic
        - a. Selenium
        - b. Alloys of Selenium with Arsenic and/or Antimony
        - c. Ar_2S_3 and Combinations Thereof with Selenium
        - d. Group III A Phosphides (Ga, Al or B)
        - e. Chalcogenides (Compounds Containing O, S, Se, or Te)
          - (1) ZnO
          - (2) PbO
        - f. Dye Sensitized Inorganic Photoconductors
        - g. Inorganic Photoconductors in Glass Binders
     2. Organic
        - a. Photosensitive Organic Compounds in a Binder
        - b. Lewis Acid Charge Transfer Complexes
   - B. Multi-Layered Photosensitive Members
     1. Members Having Subadjacent Barrier Layers
     2. Members Having Protective Overlayer
     3. Members Having Electroluminescent Layer
     4. Members Having Releasable or Soluble Layer
   - C. Deformation Imaging Members
   - D. Fibrous Photosensitive Member
   - E. Photosensitive Members—Novem Fabrication Techniques and Configurations
   - F. Apparatus for Alignment of Photosensitive members

3. CHARGING SYSTEMS
   - A. Induction Charging Systems
   - B. Non-Uniform Charging Systems
   - C. Corotron Charging Systems
     1. A.C. Charging
     2. Negative Charging
     3. With Fringe or Needle-like Electrodes
     4. Scorotron Charging
     5. Bipolar Charging
     6. Charge Level Smoothing
     7. Toner Dust Control
     8. Charge Sensing to Terminate Charging

9. Transfer From Intermediate Insulating Member

D. Charging Across a Liquid Layer

E. Charging a Semiconductive Photoconductor

F. Charging Including Illumination of Photoconductor

4. OPTICAL IMAGE FORMATION AND PROJECTION

A. Illumination of Original
1. Light Sources and Method of Illumination
2. Document Holders
a. Platen Covers
3. Illumination Control Systems

B. Projection of Optical Image onto Photoresponsive Member
1. Scanning Systems—In General
a. Distinctive Optical Scanning Systems
(1) Lens Strip
(2) Fiber Optics
(3) Half Tone Projection Systems
(4) Fresnel Lens
2. Simultaneous Charging and Projection of Optical Image
3. Distortion of Optical Image (e.g., for Coding Purposes)
4. Full Frame Exposure
5. Reflex Exposure
6. Projection with Variable Magnification
a. Magnification with Fixed Optical Path Length
7. Projection of Composite Image

C. Control of Image Contrast

5. LATENT IMAGE DEVELOPMENT SYSTEMS AND COMPOSITIONS

A. Powder Cloud Development
1. Aerosol Development Methods and Apparatus in General
a. Plate Development Apparatus
2. Cloud Charging Methods and Devices
3. Specific Toner and/or Gas Supply Devices and Methods
a. Belt and Porous Material Toner Supply Device
b. Cloud Directing Devices and Methods
4. Induction Development
5. Cleaning Devices
6. Charcoal Development Method

B. Fibrous Brush Development Devices and Methods

C. Magnetic Brush Development (Dry)
1. Magnetic Brush Development Methods and Devices
a. Magnetic Belt Devices
b. Loading Devices
2. Color Producing Development
3. Single Component Magnetic Developer

D. Cascade Development
1. Gravitational Developer Handling Methods and Devices
a. Incremental (e.g., Bucket Devices)
b. Continuous (e.g., Wheel)
c. Magnetic
d. Non-Linear Developer Flow
2. Impact Developing Methods and Devices
3. Developer Contact and Concentration Control Apparatus
4. Background Suppression Apparatus
5. Flat Plate Development

E. Liquid Development
1. Liquid Aerosol Development
2. Emulsion Development
3. Encapsulated Liquid Development
4. Electrophoretic Development
5. Polar Ink Development

F. Donor Development Methods and Apparatus

G. Dense Bed Development Methods and Apparatus

H. Fluidized Bed Development Methods and Apparatus

I. Toner and Developer Dispensing Methods and Apparatus
1. Developer Dispensing
2. Toner Dispensing
a. Powdered Toner Containers
b. Solid Toner Containers
c. Dispensing Apparatus
(1) Without Concentration Control
(2) With Concentration Control

J. Development Electrodes
1. Electrode Types in General
2. Segmented Electrodes
3. Flexible Electrodes
4. Self-Cleaning Electrodes
5. With Variation of Potential

K. Contrast and Large Area Development Enhancement

L. Simultaneous Positive-Negative Formation

M. Reversal Development

N. Developer, Toner and Carrier Compositions
1. Three Component Developer-Carrier, Toner and Additive
a. Inorganic Additive
b. Organic Additive
2. Two Component Developer
a. Distinctive Toner
(1) Polystyrene-Containing
(2) Phenol-Formaldehyde Containing
b. Distinctive Carrier
3. One Component
4. New Carriers
5. New Toners
a. Distinctive Pigment
b. Encapsulated Liquids
6. Developer Manufacture
a. Carrier Preparation
b. Toner Preparation

O. Miscellaneous

P. Simultaneous Development and Cleaning

6. COPY SUBSTRATE HANDLING SYSTEMS

A. Paper Holding Trays
1. With Stack Height Control

B. Seriatim Stack Feeding Devices
1. Mechanical
2. Aeriform

C. Non-Seriatim Stack Feeding Devices

D. Sheet Tracking, Registration, Aligning, Conveying Devices
1. Belt Conveyors
2. Clutch Mechanisms

E. Sheet Holding Devices (During Image Transfer)

F. Mispuff and Multiple Sheet Detecting Devices

G. Counter Devices

H. Sheet Stripping Devices

I. Sheet Cutting Devices

J. Sheet Inverting Devices

K. Copy Distribution, Collection and Sorting Devices

7. DEVELOPED IMAGE TRANSFER AND DISPLAY
- A. Image Display Systems
  - 1. Reflective Projection
  - 2. Transmittive Projection
- B. Chemical Treatment to Enhance Transfer
- C. Electrostatic Transfer of Toner
  - 1. Corona Charging Systems
    - a. With Conductive Transfer Web
  - 2. A.C. Field Transfer
  - 3. Multiple Transfer
  - 4. Selective Transfer
- D. Magnetic Transfer of Toner
- E. Pressure Transfer of Toner
  - 1. With Heat
  - 2. With Solvent
  - 3. With Tackified Copy Substrate
    - a. Gelatin Coated Substrate

8. IMAGE FIXING SYSTEMS
- A. Heat Fixation
  - 1. Radiation
    - a. Flash Heating
    - b. Control Systems
    - c. Glass Panel Heating
  - 2. Conduction
    - a. With Pressure Means
  - 3. Convection
  - 4. Induction
- B. Fixation with Vapor Fixative
  - 1. Fixative Removal
- C. Fixation with Liquid Fixative
- D. Fixation with Solid Fixative
- E. Fixation with Pressure
  - 1. Gelatin Coated Copy Substrate

9. CLEANING OF IMAGING SURFACE
- A. Frictional
  - 1. Web
  - 2. Brush
    - a. With Brush Scraper
    - b. With Electrostatic Assist
      - (1) Within a Liquid
    - c. Filter Bag For Use with
- B. Non-Frictional
  - 1. Magnetic Brush
  - 2. Cleaning Beads
  - 3. Liquid

10. DOCUMENT HANDLING
- A. Document Feed Apparatus
- B. Microfiche Handling Systems
- C. Stack Feeding Apparatus
- D. Facsimile Feeding Apparatus
- E. Document Registration Systems
- F. Document Inverting Apparatus
- G. Stacking and/or Imbricating Apparatus
- H. Collating Apparatus
- I. Document Jamming Detection Devices

12. PHOTOELECTROPHORESIS
- A. Basic Process and Materials
- B. Basic Apparatus
- C. Machines
- D. Air Breakdown
- E. Blocking Electrode
- F. Camera Apparatus
- G. Cleaning
- H. Apparatus Components
- I. Composite Particle
- J. Fixing
- K. Inking
- L. Masking
- M. Pigments (Including PEP Use of Particular Pigment)
- N. Process Variation
- O. Sensitizors
- P. Shear
- Q. Transfer
- R. Use of Image

15. IMAGING SYSTEMS OTHER THAN ELECTROSTATOGRAPHIC
- A. Deformation Imaging
- B. Polymerization Imaging
  - 1. Photopolymerization Imaging
  - 2. Charge Injection Polymerization Imaging
- C. Ferromagnetic Imaging
- D. Photochromic Imaging
- E. Vesicular Imaging
- F. Exposure Only Imaging

17. OPTICAL SYSTEMS
- A. Radiation Sensing
  - 1. X-ray, Ultraviolet
  - 2. Solar Cell
  - 3. Spectral Response Junctions
  - 4. Photocell Circuits
- B. Optical Projection and Modulation
  - 1. Image Projection
  - 2. Lenses, Transparencies
  - 3. Kerr Cell
  - 4. Modulators
- C. Image Conversion and Intensification
  - 1. Emission
  - 2. Infrared
  - 3. Passive
  - 4. Active (Semiconductor)
- D. Character Generation and Display Devices
  - 1. Deflection Generated Display
  - 2. Character Mask
  - 3. Translation and Function Generation
  - 4. Justifier
  - 5. Optical Lens Arrangements
- E. Optical Imaging and Scanning
  - 1. Photosensitive Scanners and Spot Scanning Systems
  - 2. Field Effect Scanners
  - 3. Lenticular
  - 4. Scanning Lens Strip and Rotating Mirror Mechanisms
  - 5. Thermotropic, Thermal, Deformation
  - 6. Optical Stabilizing Devices
- F. Electron Beam Devices
  - 1. Tubes
  - 2. Circuits
- G. Electroluminescent Devices
  - 1. Storage with Field Effect Device
  - 2. Storage Panels—Construction
  - 3. Display, Actuation
  - 4. Enhancement, Amplifications, Conversion
- H. Stimulated Emission Devices
  - 1. Laser Structure and Materials

2. Laser Structures
3. Laser Optical Systems and Applications

I. Optical Devices
1. Pressure Gauge
2. Density Measuring
3. Fiber Optics

J. Miscellaneous

18. CHEMICAL COMPOSITIONS AND PREPARATION THEREOF

A. Photosensitive
1. With a Liquid Vehicle
2. Phthalocyanine
a. X-Form
3. Carboxamides
4. Naphthols

B. Polymers

C. Developer, Toner and Carrier Compositions
1. Three Component Developer-Carrier, Toner and Additive
a. Inorganic Additive
b. Organic Additive
2. Two Component Developer
a. Distinctive Toner
(1) Polystyrene-Containing
(2) Phenol-Formaldehyde Containing
b. Distinctive Carrier
3. One Component Developer
4. New Carriers
5. New Toners
a. Distinctive Pigment
b. Encapsulated Liquids
6. Developer Manufacture
a. Carrier Manufacture
b. Toner Preparation

D. Brazing Compositions

20. MECHANICAL COMPONENTS

A. Mechanical Reaction Devices
1. Belts
2. Drives
3. Pulleys and Rollers
4. Load Movers
5. Clutch
6. Transport Motor and Speed Controls

B. Dispensing and Filtering Devices
1. Powder Cloud
2. Particulate Material Dispensing, Distribution
3. Filtering

C. Sensing Devices
1. Powder Level
2. Temperature
3. Quality (Web)
4. Pressure Gauge
5. Wind
6. Weight
7. Thickness

D. Work Devices (Mechanical)
1. Holding, Forming, Feeding
2. Bonding and Fastening
3. Coupling (Pipe)
4. Testing
5. Molding
6. Valves
7. Sizing

E. Antenna Structure

F. Fluid Amplifiers and Magnetically Controllable Switching Devices

G. Miscellaneous

21. METAL WORKING, FORMING AND TREATING

A. Electroforming and Plating
1. Methods
2. Structure
3. Apparatus

B. Metal Treating

24. GRAPHIC ARTS

A. Liquid Ink Recording
1. Electrically Responsive System
2. Electromechanically Responsive System
3. Magnetically Responsive System
4. Photoresponsive System

B. Photographic Copying
1. Transparency Formation
a. Document Support
b. Projection and Exposure
(1) Simultaneous Exposure and Development of Different Frames
(2) Image Reversal Optics
(3) Automatic Masking
c. Transparency Identification
d. Frame Counting and Locating
e. Miscellaneous
2. Contact Printing From a Transparency
a. Transparency Feed
b. Establishing and Maintaining Contact Between Transparency and Copy Material
c. Exposure Control
d. Transfer Imaging
(1) Image Layer Support Strip
3. Processing
a. Material Purification
b. Transparency Transport
4. Viewing

C. Duplicating
1. Method and Apparatus
a. Thermographic
b. Pressure Applied to Sandwich of Original, Transfer and Receiving Sheet
c. Transfer of Electrostatic Charge Through Stencil
d. Condensation Imaging
e. Spirit and Dry Duplicating Systems (Including ELCAR)
(1) Means for Rotably Mounting a Transfer Sheet
(2) Means for Establishing Pressure Between Transfer Sheet and Copy Substrate
(3) Copy Substrate Handling
(4) Program Control
(5) Formation of a Spirit Duplicating Transfer Sheet
(6) Formation of a Stencil Transfer Sheet
(7) Composition of a Transfer Sheet, Receiving Sheets and Printing Inks

D. Planographic Imaging (Including Lithography)

E. Relief Imaging

F. Gravure Printing

G. Miscellaneous

25. ELECTRONIC COMPONENTS

A. Passive Components
1. Printed Circuit Boards
2. Semiconductor Devices
3. Thin Film Components
4. Connectors

B. Active Components

1. Space Charge Devices
2. Junction Devices
3. Thermionic Conversion Devices
4. Thyratrons

C. Circuits
1. Amplifiers
2. Switching
3. Oscillators and Generators
4. Pulse Circuitry, Including Signal Storage and Delay
5. Power Supply
6. Miscellaneous

26. DESIGN PATENTS

A. Reproduction Apparatus
1. In General
2. Document Feeding Apparatus
3. Transfer and Fusing Apparatus
4. Printer
5. Camera

B. Sorting and/or Storing Apparatus

C. Containers for Xerographic Powder

D. Labeling Apparatus

E. Facsimile Transmission Apparatus
1. In General
2. Transceiver Paper Feed Apparatus
3. Adapter for Facsimile Computer System

F. Microform Apparatus
1. Viewer and/or Copier

G. Educational Devices
1. Scales

H. Miscellaneous
1. Housing For Electronic Apparatus
2. Computer Keyboard
3. Send/Receive Data Printer Terminal
4. Telephone Acoustic Coupler
5. Prism
6. Paper Shredder
7. Other

27. PHOTOGRAPHY

A. Direct Printout Members

B. Direct Printout Processes

C. Imaging Member Fabrication

D. Photographic Processes Generally

30. MANIFOLD

A. Basic Process

B. Apparatus

C. Process Variations

D. Activation

E. Image Transfer and Fixing

F. Duplication Masters

G. Image Reversal

H. Reflex Imaging

I. Color Processes

31. MIGRATION IMAGING (XDM)

A. Basic Process

B. Apparatus

C. Process Variation

D. Imaging Members

E. Imaging Member Fabrication

F. Imaged Members

G. Stripping and Splitting

H. Reversal

I. Fixing

J. Duplicating Masters

K. Color

L. Use of Image

32. MISCELLANEOUS

A. Energy Cells

B. Miscellaneous

FOREIGN COUNTRY KEY LETTER CODE

COUNTRY KEY	COUNTRY NAME
AAA	NO FOREIGN FILING
ALB	ALBANIA
ALG	ALGERIA
ARG	ARGENTINA
ATR	AUSTRIA
AUS	AUSTRALIA
BAH	BAHAMAS
BAR	BAHRAIN
BEL	BELGIUM
BOL	BOLIVIA
BRA	BRAZIL
BRS	BR. SOLOMON ISL.
BRU	BRUNEI
BUL	BULGARIA
BUR	BURUNDI
CAM	CAMBODIA
CAN	CANADA
CEY	CEYLON
CHL	CHILE
CHN	CHINA
CLB	COLOMBIA
COR	CONGO REP. (ZAIRE)
COS	COSTA RICA
CUB	CUBA
CZC	CZECHOSLOVAKIA
DNK	DENMARK
DOR	DOMINICAN REP.
ECD	ECUADOR
EGP	EGYPT
EGR	E. GERMANY
EIR	EIRE
ELS	EL SALVADOR
FIJ	FIJI
FIN	FINLAND
FOM	FORMOSA
FRA	FRANCE
GER	GERMANY
GHA	GHANA
GIB	GIBRALTAR
GIE	GIBERT & ELLICE
GNR	GUINEA REP.
GRB	GR. BRITAIN
GRK	GREECE
GUA	GUATEMELA
GUR	GUERNSEY
HGK	HONG KONG
HOL	HOLLAND
HON	HONDURAS
HUN	HUNGARY
ICE	ICELAND
IDS	INDONESIA
IND	INDIA
IRL	IRELAND
IRN	IRAN
ISR	ISRAEL
ITL	ITALY
JAM	JAMAICA
JAP	JAPAN
JER	JERSEY
KEN	KENYA
KOR	KOREA

COUNTRY KEY	COUNTRY NAME
KUW	KUWAIT
LAS	LAOS
LEB	LEBANON
LIB	LIBERIA
LXB	LUXEMBOURG
MAU	MAURITIUS
MEX	MEXICO
MLI	MALI
MLS	MALASIA
MLT	MALTA
MLW	MALAWI
MNC	MONACO
MRC	MOROCCO
NIG	NIGERIA
NOR	NORWAY
NZL	NEW ZEALAND
PAK	PAKISTAN
PLD	POLAND
PLP	PHILIPPINES
PNM	PANAMA
PRU	PERU
PTG	PORTUGAL
RHD	RHODESIA
RMN	RUMANIA
RWD	RWANDA
SAB	SAUDI ARABIA
SAF	SOUTH AFRICA
SBH	SABAH
SGP	SINGAPORE
SHL	ST. HELENA
SLN	SIERRA LEONE
SPN	SPAIN
SRK	SARAWAK
STZ	SWITZERLAND
SWA	SO. WEST AFRICA
SWD	SWEDEN
SYA	SYRIA
TGR	TANGIER
THL	THAILAND
TIW	TAIWAN
TNS	TUNIS
TRD	TRINIDAD
TRK	TURKEY
TZN	TANZANIA
UGD	UGANDA
UK	UNITED KINGDOM (Fuji Xerox list only)
URG	URUGUAY
USA	USA
USR	USSR
UAR	UNITED ARAB REP.
VTM	VIETNAM
VZL	VENEZUELA
YGS	YUGOSLAVIA
ZMB	ZAMBIA
ZZZ	

FOREIGN COUNTRY KEY LETTER CODE

FUJI XEROX PATENTS

Class 1A1C

3,569,803.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING FRICTION CHARGING. MAR. 9, 1971. BEL. 719365, CAN. 925561, FRA. 1577647, U.K. 1232470.

3,573,905.—METHOD OF PRODUCING ELECTROPHOTOSENSITIVE CADMIUM SULFIDE WITH CRYSTALS OF A HEXAGONALITY OF LESS THAN 80%. APR. 6, 1971. BEL. 682886, CAN. 814845, FRA. 1526846, JAP. 43-16195, MEX. 93082, U.K. 1148487.

3,775,103.—ELECTROPHOTOGRAPHIC MATERIAL AND PROCESS FOR PRODUCING SAME. NOV. 27, 1973. BEL. 693919, FRA. 1511300, GER. 1,522,612, ITL. 798303, NOR. 122730, U.K. 1,183,762.

3,775,106.—ELECTROPHOTOGRAPHIC PROCESS. NOV. 27, 1973. BEL. 771855, CAN. 946465, JAP. 49-17531, U.K. 1328318.

Class 1A1F

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

Class 1A2

4,105,466.—ORGANIC PHOTOCONDUCTIVE COATING COMPOSITIONS CONTAINING TRICYANOVINYL COMPOUNDS FOR ELECTROPHOTOGRAPHY. AUG. 8, 1978. U.K. 1531921.

Class 1A2C

3,660,086.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING INORGANIC PHOTOCONDUCTIVE MATERIAL WITH A PHOTOCHROMIC SENSITIZING AGENT. MAY 2, 1972. U.K. 1290441.

3,799,773.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A PHOTOCHROMIC COMPOUND AND TRANSPARENT TONER. MAR. 26, 1974.

Class 1A6

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974. JAP. 48-1330.

4,197,119.—ELECTROPHOTOGRAPHIC PROCESS. APR. 8, 1980.

Class 1C4B

3,563,733.—METHODS OF PREPARING RELIEF IMAGES BY ENZYMATIC DIGESTION. FEB. 16, 1971. BEL. 709856, CAN. 830395, FRA. 1564578, JAP. 46-11628, U.K. 1217087.

3,630,728.—ELECTROPHOTOGRAPHIC METHOD OF FORMING RELIEF IMAGES. DEC. 28, 1971. BEL. 728693, CAN. 877883, FRA. 2002.362, JAP. 46-41348, U.K, 1228509.

Class 1E

3,549,359.—COLOR ELECTROPHOTOGRAPHY EMPLOYING DYE TRANSFER FROM A DYE-CONTAINING PHOTOSENSITIVE LAYER TO AN IMAGE RECEIVING SHEET. DEC. 22, 1970. FRA. 1524473, GER. 1,572,341, JAP. 45-40159, U.K. 1,183,532.

3,615,391.—ELECTROPHOTOGRAPHIC COLOR DEVELOPING METHOD. OCT. 26, 1971. AUS. 435735, CAN. 842157, FRA. 1572518, JAP. 46-21996, U.K. 1231846, U.K. 1257609.

3,615,392.—ELECTROPHOTOGRAPHIC REPRODUCTION OF ORIGINALS CONTAINING BOTH MULTICOLOR AND LINE AREAS. OCT. 26, 1971. CAN. 902986, JAP. 46-43951.

3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924.951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

3,656,947.—CODING OF ORIGINALS AND SENSITIVE PAPER IN A MULTI-COLOR ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. BEL. 748591, CAN. 902987, FRA. 7012518, JAP. 48-26778, U.K. 1309644.

3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972. JAP. 47-19395.

3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. CAN. 925929, JAP. 48-28697.

3,689,260.—COLOR ELECTROPHOTOGRAPHIC PROCESS WITH RESIN DEPOSITION FOR STABILIZATION OF TONER IMAGE. SEPT. 5, 1972. AUS. 437666, BEL. 7531555, CAN. 927649, FRA. 7025295, ITL. 910210, JAP. 48-26779, U.K. 1279506.

3,705,767.—ELECTROPHOTOGRAPHIC DEVICE. DEC. 12, 1972. BEL. 753687, CAN. 947357, FRA. 7026800, GER. 2036140, ITL. 902477, JAP. 48-11054, U.K. 1266112.

3,779,639.—COLOR ELECTROPHOTOGRAPHIC APPARATUS. DEC. 18, 1973. U.K. 1331870.

3,785,812.—METHOD OF EXPOSURE IN MULTI-COLOR ELECTROPHOTOGRAPHY. JAN. 15, 1974. ARG. 185812, AUS. 417288, BEL. 759392, CAN. 945619, FRA. 7042329, ITL. 914549, JAP. 49-23905, U.K. 1322847.

3,806,340.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A POLAR ORGANIC SOLVENT VAPOR. APR. 23, 1974. BEL. 774765, CAN. 946671, FRA. 7138742, JAP. 49-23905, U.K. 1322847.

Class 1F

3,473,923.—REPRODUCTION PROCESS INCLUDING TRANSFER AND REDEVELOPMENT OF ELECTROSTATICALLY FORMED IMAGES. OCT. 21, 1969. BEL. 679506, FRA. 1479592, GER. 1,522,597. JAP. 43-07586, U.K. 1152832.

3,745,002.—METHOD OF PREPARING A PRINTING MASTER BY XEROGRAPHY. JULY 10, 1973. ARG. 120543, AUS. 432568, BEL. 756.595, CAN. 903014, FRA. 2068748, JAP. 48-27362, MEX. 119463, U.K. 1314109.

3,788,845.—PROCESS FOR FORMING DYE IMAGES. JAN. 29, 1974.

Class 1G

3,764,309.—COLOR PRINTING METHOD. OCT. 9, 1973. BEL. 724581, CAN. 877884, FRA. 1595848, ITL. 848192, JAP. 46-33541, U.K. 1223020.

Class 1G1

4,151,604.—IMAGE STORAGE AND OPTICAL READOUT DEVICE HAVING STRIPED ELECTRODES. APR. 24, 1979.

Class 1I

3,762,811.—METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 2, 1973.

3,784,301.—ELECTROPHOTOGRAPHIC BORDER APPARATUS. JAN. 8, 1974. JAP. 49-26590.

Class 1J6

3,796,187.—APPARATUS FOR DEVELOPING CONTINUOUS ELECTROPHOTOGRAPHIC PHOTOSENSITIVE WEB MATERIAL. MAR. 12, 1974. BEL. 769412, CAN. 934541, FRA. 7123852, ITL. 934462, U.K. 1332534.

Class 1K

3,408,217.—FINGERPRINT RECORDING. OCT. 29, 1968. JAP. 41-21520, U.K. 1095572.

3,492,140.—METHOD OF RECORDING FINGERPRINTS OF HUMAN BODY. JAN. 7, 1970. FRA. 1386116, JAP. 39-27575, U.K. 1063635.

Class 1K3

3,745,002.—METHOD OF PREPARING A PRINTING MASTER BY XEROGRAPHY. JULY 10, 1973. ARG. 120543, AUS. 432568, BEL. 756.595, CAN. 903014, FRA. 2068748, JAP. 48-27362, MEX. 119463, U.K. 1314109.

Class 2A1B

4,170,476.—LAYERED PHOTOCONDUCTIVE ELEMENT HAVING AS AND/OR TE DOPED WITH GA, IN OR TL INTERMEDIATE TO SE AND INSULATOR. OCT. 9, 1979. U.K. 1535629.

Class 2A1E

3,506,595.—PHOTOCONDUCTIVE INSULATING MATERIALS. APR. 14, 1970. FRA. 1498064, GER. 1,522,606, JAP. 43-24394, U.K. 1148537.

3,615,401.—PROCESS FOR THE PREPARATION OF PHOTOCONDUCTIVE LIGHT-SENSITIVE MATERIALS COMPRISING CdS OR CdS.N $CdCo_2$. OCT. 26, 1971. FRA. 2001257, JAP. 47-40819, U.K. 1239129.

3,615,410.—ELECTROPHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A PROTEASE ENZYME. OCT. 26, 1971. BEL. 730415, CAN. 885386, FRA. 2004.940, U.K. 1224711.

Class 2A1E1

3,385,699.—PROCESS FOR PROCESSING ELECTROPHOTOSENSITIVE LAYERS. MAY 28, 1968. BEL. 651039, FRA. 1402385, HOL. 130806, SWD. 310458, U.K. 1072476.

3,494,766.—LIGHT SENSITIVE LAYER FOR ELECTROPHOTOGRAPHY. FEB. 10. 1970. CAN. 791648, FRA. 1460449, NOR. 112288, SWD. 226000, U.K. 1085939.

3,494,789.—PHOTOCONDUCTIVE INSULATING MATERIAL. FEB. 10, 1970. CAN. 813830, FRA. 1564467, ITL. 788829, JAP. 44-10631, MEX. 88112, U.K. 1120091.

3,615,410.—ELECTROPHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A PROTEASE ENZYME. OCT. 26, 1971. BEL. 730415, CAN. 885386, FRA. 2004.940, U.K. 1224711.

3,634,333.—PROCESS FOR COATING ZINC OXIDE POWDER WITH CADMIUM SULFIDE. JAN. 11, 1972. BEL. 731056, CAN. 882.627, FRA. 2.005.849, GER. 1916761, JAP. 47-49616, U.K. 1215685.

3,660,086.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING INORGANIC PHOTOCONDUCTIVE MATERIAL WITH A PHOTOCHROMIC SENSITIZING AGENT. MAY 2, 1972. U.K. 1290441.

3,674,476.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE LAYER FOR ELECTROPHOTOGRAPHY. JULY 4, 1972. BEL. 751.676, CAN. 918481, FRA. 2051030, U.K. 1264719.

3,689,260.—COLOR ELECTROPHOTOGRAPHIC PROCESS WITH RESIN DEPOSITION FOR STABILIZATION OF TONER IMAGE. SEPT. 5, 1972. AUS. 437666, BEL. 753155, CAN. 927649, FRA. 7025295, ITL. 910210, JAP. 48-26779, U.K. 1279506.

3,707,392.—METHOD OF SENSITIZATION OF AN ELECTROPHOTOGRAPHIC MATERIAL. DEC. 26, 1972. AUS. 444836, BEL. 744600, CAN. 888125, FRA. 7001955, GER. 2002607, ITL. 892368, JAP. 48-7814, U.K. 1257154.

3,725,060.—HEMATEIN OR HEMATOXYLIN-CONTAINING ZINC OXIDE PHOTOCONDUCTIVE LAYERS. APR. 3, 1973. JAP. 49-4340.

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973. JAP. 45-990335.

Class 2A1F

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE CONTAINING ELECTRON DONOR DYE LAYERS. JULY 23, 1968. JAP. 44-15758, U.K. 1,106,562.

3,476,659.—ELECTROPHOTOGRAPHIC IMAGING AND COPYING PROCESS. NOV. 4, 1969. BEL. 684406, FRA. 1489929, ITL. 773333, JAP. 43-27579, U.K. 1159394.

3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924.951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

3,704,123.—DYE SENSITIZED PHOTOCONDUCTIVE MATERIAL. NOV. 28, 1972. AUS. 424510, BEL. 720260, CZC. 142206, FRA. 1568416, GER. 1772210, ITL. 831114, JAP. 47-20753, U.K. 1190676, USR. 374866.

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

3,707,392.—METHOD OF SENSITIZATION OF AN ELECTROPHOTOGRAPHIC MATERIAL. DEC. 26, 1972. AUS. 444836, BEL. 744600, CAN. 888125, FRA. 7001955, GER. 2002607, ITL. 892368, JAP. 48-7814, U.K. 1257154.

Class 2A1G

3,541,028.—PHOTOCONDUCTIVE INSULATING MATERIALS. NOV. 17, 1970. FRA. 1494699, GER. 1,522,605, JAP. 43-14494, U.K. 1128417.

Class 2A2

3,647,428.—PHOTOCONDUCTIVE MATERIAL FOR ELECTROPHOTOGRAPHY. MAR. 7, 1972. AUS. 429949, BEL. 759550, CAN. 924162, FRA. 2072521, ITL. 923181, JAP. 48-4316, U.K. 1269429.

3,704,119.—ELECTROPHOTOGRAPHIC PROCESS USING TONER OF SAME REFRACTIVE INDEX AS ORGANIC PHOTOCONDUCTIVE LAYER. NOV. 28, 1972. AUS. 433360, BEL. 754544, FRA. 7028556, ITL. 902771, JAP. 48-21054, U.K. 1321065.

Class 2A2A

3,707,369.—PHOTOCONDUCTIVE ELEMENTS CONTAINING 2-METHYL-3, 3-DIMETHYL INDOLE DERIVATIVES. DEC. 26, 1972. BEL. 754969, CAN. 898823, FRA. 703049, GER. 2041490, U.K. 1268889.

4,209,579.—ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MATERIAL WITH A QUINOCYANINE PIGMENT. JUNE 24, 1980.

Class 2B

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL CONTAINING ELECTRON-DONOR DYE LAYERS. JULY 23, 1968. JAP. 44-15758, U.K. 1,106,562.

3,656,949.—METHOD OF PRODUCING AN ELECTROPHOTOGRAPHIC AND ELECTROGRAPHIC RECORDING MEMBER. APR. 18, 1972. BEL. 734288, CAN. 890875, FRA. 6919148, GER. 1929162, JAP. 48-787, U.K. 1259158.

3,704,121.—ELECTROPHOTOGRAPHIC REPRODUCTION PROCESS USING A DUAL LAYERED PHOTORECEPTOR. NOV. 28, 1972. BEL. 739153, FRA. 6932116, ITL. 890989, JAP. 49-25218, SPN. 371685, STZ. 519188, U.K. 1272131.

4,023,181.—RECORDING MEDIUM CONDUCTIVE ELECTRODE. MAY 10, 1977. JAP. 49-91720.

4,042,936.—ELECTROSENSITIVE RECORDING METHOD. AUG. 16, 1977. JAP. P49-042206.

Class 2B1

3,574,682.—ELECTROSTATIC RECORDING MATERIALS. APR. 13, 1971. U.K. 1213395.

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974. JAP. 48-1330.

Class 2B2

3,552,956.—METHOD FOR TREATING ELECTROPHOTOGRAPHIC RECORDING MATERIALS WITH PROTECTIVE OVERCOATINGS. JAN. 5, 1971. BEL. 693184, FRA. 1508918, SWD. 326372, U.K. 1155665.

3,717,461.—REMOVAL OF PROTECTIVE RESIN LAYER BY LIQUID DEVELOPER IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 20, 1973. ARG. 182091, AUS. 428797, BEL. 762.808, CAN. 929016, FRA. 2078511, ITL. 919801, MEX. 120941, U.K. 1326300.

Class 2B4

3,428,453.—IMAGING FORMING PROCESS UTILIZING XEROGRAPHY. FEB. 18, 1969. FRA. 1,428,775, ITL. 754,825, JAP. 43-02622, U.K. 1,085,151.

Class 2E

3,417,733.—APPARATUS FOR VACUUM COATING. DEC. 24, 1968. FRA. 1,415,251, GER. 1,521,238, JAP. 40-26402, U.K. 1,081,324.

3,573,905.—METHOD OF PRODUCING ELECTROPHOTOSENSITIVE CADMIUM SULFIDE WITH CRYSTALS OF A HEXAGONALITY OF LESS THAN 80% APR. 6, 1971. BEL. 682886, CAN. 814845, FRA. 1526846, JAP. 43-16195, MEX. 93082, U.K. 1148487.

3,656,949.—METHOD OF PRODUCING AN ELECTROPHOTOGRAPHIC AND ELECTOGRAPHIC RECORDING MEMBER. APR. 18, 1972. BEL. 734288, CAN. 890875, FRA. 6919148, GER. 1929162, JAP. 48-787, U.K. 1259158.

3,672,988.—METHOD OF MANUFACTURING BASES FOR ELECTROSTATIC RECORDING MATERIAL OR ELECTROPHOTOGRAPHIC MATERIAL. JUNE 27, 1972. AUS. 437336, BEL. 746420, CAN. 898621, GER. 2008636, ITL. 888758, JAP. 47-45549, U.K. 1301926.

3,674,476.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE LAYER FOR ELECTROPHOTOGRAPHY. JULY 4, 1972. BEL. 751.676, CAN. 918481, FRA. 2051030, U.K. 1264719.

3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 930693, JAP. 48-15037, U.K. 1329569.

3,775,103.—ELECTROPHOTOGRAPHIC MATERIAL AND PROCESS FOR PRODUCING SAME. NOV. 27, 1973. BEL. 693919, FRA. 1511300, GER. 1522612, ITL. 798303, NOR. 122730, U.K. 1183762.

3,927,638.—VACUUM EVAPORATION PLATING APPARATUS. DEC. 23, 1975.

3,984,585.—VACUUM EVAPORATION PLATING METHOD. MAY 5, 1976. FRA. 7422500, GER. P-2430653.4, JAP. 48-72263, U.K. 1,214,698.

Class 2F

3,998,548.—SENSITIVE DRUM RECEIVING DEVICE FOR USE IN ELECTROPHOTOGRAPHIC REPRODUCING MACHINE. DEC. 21, 1976. JAP. 49-94060, U.K. 32984/75.

Class 3

3,764,207.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING SINGLE CHARGING MEANS FOR EFFECTING SIMULTANEOUS FUNCTIONS OF CHARGING AND FACILITATING TONER IMAGE TRANSFER. OCT. 9, 1973.

Class 3C

3,612,864.—IMAGING SYSTEM UTILIZING AN ELECTRODE TREATED WITH A MIXTURE OF A HYGROSCOPIC MATERIAL AND A HYDROPHILIC BINDER. OCT. 12, 1971. BEL. 726690, CAN. 885615, JAP. 47-12440.

3,775,106.—ELECTROPHOTOGRAPHIC PROCESS. NOV. 27, 1973. BEL. 771855, CAN. 946465, JAP. 49-17531, U.K. 1328318.

Class 3C1

3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 930693, JAP. 48-15037, U.K. 1329569.

Class 3C3

3,649,830.—UNIFORM CHARGING METHOD AND APPARATUS USING AN ARRAY OF NEEDLE ELECTRODES. MAR. 14, 1972. CAN. 940590, JAP. 48-28301, U.K. 1279758.

3,655,966.—ELECTRIC CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. APR. 11, 1972. CAN. 922359, JAP. 48-25942, U.K. 1323599.

Class 3C4

3,719,481.—ELECTROSTATOGRAPHIC IMAGING PROCESS. MAR. 6, 1973. CAN. 948693, FRA. 7108391, ITL. 921208, U.K. 1281149.

Class 3C5

3,715,640.—CORONA CHARGING PROCESS AND APPARATUS IN ELECTROPHOTOGRAPHY. FEB. 6, 1973. AUS. 425637, BEL. 765716, CAN. 927473, FRA. 71131128, ITL. 923947, JAP. 49-17379, U.K. 1338691.

3,779,749.—METHOD OF CHARGING IN ELECTROPHOTOGRAPHY. DEC. 18, 1973. BEL. 772412, CAN. 9481495, FRA. 7132246, ITL. 942080, JAP. 49-17532, U.K. 1359182.

3,788,844.—CHARGING METHOD FOR ELECTROPHOTOGRAPHY. JAN. 29, 1974. JAP. 49-13025, U.K. 1344908.

3,789,222.—CORONA CHARGE METHOD. JAN. 29, 1974. BEL. 771311, CAN. 943180, FRA. 7129655, ITL. 933902, JAP. 49-17530.

3,789,224.—PROCESS FOR CHARGING ELECTROPHOTOGRAPHIC MATERIALS. JAN. 29, 1974. AUS. 435928, BEL. 772465, CAN. 945834, FRA. 7132445, ITL. 938023, JAP. 49-23902, U.K. 1359181.

Class 3C9

3,582,731.—CHARGING SYSTEM. JUNE 1, 1971. CAN. 906045, JAP. 46-30636.

Class 3D

3,546,545.—METHOD OF CHARGING A PHOTOCONDUCTIVE INSULATING LAYER. DEC. 8, 1970. BEL. 721040, FRA. 1586221, U.K. 1205297.

3,569,803.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING FRICTION CHARGING. MAR. 9, 1971. BEL. 719365, CAN. 925561, FRA. 1577647, U.K. 1232470.

Class 3E

3,704,121.—ELECTROPHOTOGRAPHIC REPRODUCTION PROCESS USING A DUAL LAYERED PHOTORECEPTOR. NOV. 28, 1972. BEL. 739153, FRA. 6932116, ITL. 890989, JAP. 49-25218, SPAN. 371685, STZ. 519188, U.K. 1272131.

3,715,640.—CORONA CHARGING PROCESS AND APPARATUS IN ELECTROPHOTOGRAPHY. FEB. 6, 1973. AUS. 425637, BEL. 765716, CAN. 927473, FRA. 71131128, ITL. 923947, JAP. 49-17379, U.K. 1338691.

Class 3F

3,749,927.—ELECTROSTATIC CHARGING PROCESS FOR ELECTROPHOTOSENSITIVE MATERIAL. JULY 31, 1973. AUS. 435008, BEL. 469413, FRA. 7123717, ITL. 934461, JAP. 49-16060, U.K. 1316047.

3,778,148.—APPARATUS AND METHOD FOR SELECTIVELY DISCHARGING THE PHOTOCONDUCTIVE SURFACE OF AN ELECTROSTATIC DRUM COPIER TO FACILITATE THE CLEANING THEREOF. DEC. 11, 1973.

3,778,623.—CHARGING METHOD OF ELECTROPHOTOGRAPHIC MATERIALS. DEC. 11, 1973. FRA. 7229549.

3,789,223.—CHARGING METHOD FOR RELATIVELY MOVABLE ELECTROPHOTOGRAPHIC MEANS AND CORONA MEANS. JAN. 29, 1974. AUS. 431512, BEL. 771143, FRA. 7129349, ITL. 935108, JAP. 49-17529, U.K. 1347100.

3,789,224.—PROCESS FOR CHARGING ELECTROPHOTOGRAPHIC MATERIALS. JAN. 29, 1974. AUS. 435928, BEL. 772465, CAN. 945834, FRA. 7132445, ITL. 938023, JAP. 49-23902, U.K. 1359181.

Class 4A

3,741,644.—ORIGINAL POSITION CONFIRMING MEANS FOR DUPLICATING APPARATUS. JUNE 26, 1973.

Class 4A1

3,771,082.—COPYING APPARATUS WITH AUXILIARY LIGHT SOURCE FOR ILLUMINATING AN ORIGINAL TO BE REPRODUCED. NOV. 6, 1973. U.K. 1350616.

3,841,752.—LIGHT SOURCE FOR COPYING MACHINE. OCT. 15, 1974.

Class 4A2

3,737,223.—PLATEN DRIVING DEVICE IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JUNE 5, 1973. U.K. 1341619.

Class 4B

3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. ARG. 182081, BEL. 759454, CAN. 932785, FRA. 7043828, ITL. 909538, JAP. 49-18265, U.K. 1327486.

3,784,301.—ELECTROPHOTOGRAPHIC BORDER APPARATUS. JAN. 8, 1974. JAP. 49-26590.

3,785,812.—METHOD OF EXPOSURE IN MULTI-COLOR ELECTROPHOTOGRAPHY. JAN. 15, 1974. ARG. 185812, AUS. 417288, BEL. 759392, CAN. 945619, FRA. 7042329, ITL. 914549, JAP. 49-11573, U.K. 1326580.

Class 4B1

3,927,940.—MANUSCRIPT SCANNING DEVICE FOR COPYING MACHINES AND THE LIKE. DEC. 23, 1975.

3,955,048.—SCANNING METHOD AND APPARATUS. MAY 4, 1976.

Class 4B1A

3,778,153.—OPTICAL IMAGING SYSTEM. DEC. 11, 1973.

4,063,813.—METHOD OF EXPOSING A LIGHT SENSITIVE MEMBER. DEC. 20, 1977. JAP. 51-89646, U.K. 76-19272.

Class 4B7

3,313,883.—SYSTEMS FOR RECORDING CHARACTERS ON LIGHT SENSITIVE RECORDING SURFACES. AUG. 25, 1964. CAN. 693,055, FRA. 1,246,197, GER. 1,449,634, JAP. 318,009.

3,615,391.—ELECTROPHOTOGRAPHIC COLOR DEVELOPING METHOD. OCT. 26, 1971. AUS. 435735, CAN. 842157, FRA. 1572518, JAP. 46-21996, U.K. 1231846, U.K. 1257609.

3,656,947.—CODING OF ORIGINALS AND SENSITIVE PAPER IN A MULTI-COLOR ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. BEL. 748591, CAN. 902987, FRA. 7012518, JAP. 48-26778, U.K. 1309644.

Class 5A1A

3,451,376.—DEVELOPING DEVICE FOR ELECTROPHOTOGRAPHY. JUNE 24, 1969. AUS. 410555, FRA. 1556520, SWD. 319382, U.K. 1173377.

Class 5A2

3,418,972.—POWDER DUSTING DEVICE FOR ELECTROPHOTOGRAPHY. DEC. 31, 1968. FRA. 1544620, JAP. 45-8838, U.K. 1169410.

Class 5A3B

3,418,972.—POWDER DUSTING DEVICE FOR ELECTROPHOTOGRAPHY. DEC. 31, 1968. FRA. 1544620, JAP. 45-8838, U.K. 1169410.

Class 5A4

3,681,065.—DYE TRANSFER COLOR ELECTROPHOTOGRAPHY. AUG. 1, 1972. CAN. 884,227, JAP. 44-32208.

Class 5A5

3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 915753, CAN. 933997, JAP. 48-13454.

Class 5C

3,927,641.—DEVELOPING MECHANISM USING MAGNETIC BRUSH. DEC. 23, 1975.

3,937,181.—MAGNETIC BRUSH TYPE DEVELOPING MECHANISM IN ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 10, 1976.

Class 5C1

3,545,968.—DEVELOPING A LATENT ELECTROSTATIC IMAGE WITH FERROMAGNETIC CARRIER AND TONER BY EMPLOYING A VARYING MAGNETIC FIELD. DEC. 8, 1970. BEL. 710692, FRA. 1561470, U.K. 1205175.

3,908,595.—MAGNETIC BRUSH DEVELOPMENT APPARATUS UTILIZING MAGNETIC MEANS. SEPT. 30, 1975.

3,977,361.—MAGNETIC BRUSH DEVELOPMENT DEVICE. AUG. 31, 1976. GER. P2521275.3, JAP. 49-52302, KOR. 3670, TIW. 6410622, U.K. 19955-75.

3,981,271.—MAGNETIC BRUSH TYPE DEVELOPER FOR USE IN AN ELECTROPHOTOGRAPHIC MACHINE. SEPT. 21, 1976. GER. P25073910, JAP. 49-19615, U.K. 6841-75.

3,985,099.—MAGNETIC BRUSH DEVELOPING DEVICE. OCT. 12, 1976. GER. P2521291.3 JAP. 52303, KOR. 3669, TIW. 6410736, U.K. 19951-75.

4,048,958.—MAGNETIC BRUSH DEVELOPING DEVICE. SEPT. 20, 1977. KOR. 4052-74, TIW. 22,999, U.K. 9472/76, W. GER. P2611755.5.

4,194,465.—MAGNETIC BRUSH DEVELOPER DEVICE. MAR. 25, 1980.

Class 5C2

3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972. JAP. 47-19395.

3,764,309.—COLOR PRINTING METHOD. OCT. 9, 1973. BEL. 724581, CAN. 877884, FRA. 1595848, ITL. 848192, JAP. 46-33541, U.K. 1223020.

Class 5D1

3,783,818.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. JAN. 8, 1974. BEL. 781515, FRA. 7211409, ITL. 950927, U.K. 1358450.

Class 5D2

3,336,904.—XEROGRAPHIC DEVELOPING APPARATUS. AUG. 22, 1967. BEL. 651786, GER. 1,472,946, HOL. 132649, JAP. 40-23755, U.K. 1068575.

Class 5D3

3,804,659.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS FOR ENHANCING THE QUALITY OF THE DEVELOPED IMAGE. APR. 16, 1974. FRA. 7144069, JAP. 49-26901.

Class 5E

3,540,885.—REDUCTION OF FOG FORMATION IN AN ELECTROPHOTOGRAPHIC LIGHT SENSITIVE SHEET. NOV. 17, 1970. BEL. 693302, FRA. 1509571, JAP. 44-2551, U.K. 1176001.

3,560,203.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. FEB. 2, 1971. FRA. 1604137, U.K. 1165038.

3,566,834.—ELECTROPHOTOGRAPHIC DEVELOPING DEVICE. MAR. 2, 1971. AUS. 417201, BEL. 718329, FRA. 1578391, JAP. 48-31853, U.K. 1194789.

3,622,515.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPER HAVING A PROTEOLYTIC ENZYME. NOV. 23, 1971. AUS. 436813, BEL. 732273, CAN. 896948, FRA. 2007.520, ITL. 867188, JAP. 47-17879, U.K. 1231544.

3,627,557.—LIQUID DEVELOPMENT BY REDUCING THE VISCOSITY OF THE DEVELOPER ON A ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971. CAN. 905230, U.K. 1303499.

3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. BEL. 751669, CAN. 902982, FRA. 7021033, ITL. 893939, JAP. 48-18859, U.K. 1284477.

3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972. CAN. 867698.

3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972. CAN. 917486, JAP. 48-8134, U.K. 1278858.

3,685,907.—ELECTROPHOTOGRAPHIC PROCESS. AUG. 22, 1972. ARG. 181932, AUS. 442703, BEL. 752387, CAN. 910132, FRA. 2-51297, ITL. 902170, MEX. 116451, U.K. 1292200.

3,692,523.—PROCESS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE AND LIQUID DEVELOPER USED THEREFOR. SEPT. 19, 1972. AUS. 437065, BEL. 745533, CAN. 924.167, FRA. 7040233, GER. 20052680, ITL. 888.449, JAP. 48-7821, U.K. 1255445.

3,703,400.—DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. NOV. 21, 1972. AUS. 435816, BEL. 748.590, CAN. 898073, FRA. 7012445, GER. 2016586, ITL. 903950, U.K. 1251623.

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

3,705,767.—ELECTROPHOTOGRAPHIC DEVICE. DEC. 12, 1972. BEL. 753687, CAN. 947357, FRA. 7026800, GER. 2036140, ITL. 902477, JAP. 48-11054, U.K. 1266112.

3,707,139.—LIQUID TYPE ELECTROPHOTOGRAPHY DEVELOPING APPARATUS. DEC. 26, 1972. BEL. 756409, CAN. 918413, FRA. 7034577, GER. 1314865.

3,713,422.—APPARATUS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE BY LIQUID DEVELOPMENT. JAN. 30, 1973. BEL. 764267, CAN. 932954, FRA. 7109086, GER. 763,992, U.K. 1341631.

3,716,360.—MOLTEN IMAGE TRANSFER IN ELECTROPHOTOGRAPHY. FEB. 13, 1973. BEL. 763191, FRA. 7105717, GER. 2108080, ITL. 919905, U.K. 1313059.

3,717,461.—REMOVAL OF PROTECTIVE RESIN LAYER BY LIQUID DEVELOPER IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 20, 1973. ARG. 182091, AUS. 428797, BEL. 762808, CAN. 929016, FRA. 2078511, ITL. 919801, MEX. 120941, U.K. 1326300.

3,718,593.—PROCESS FOR THE PRODUCTION OF AN ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. FEB. 27, 1973. AUS. 438586, BEL. 745535, CAN. 924166, FRA. 7004034, ITL. 888743, JAP. 48-7822, U.K. 1255763.

3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATIN. JUNE 12, 1973. CAN. 921746, JAP. 47-30858, U.K. 1277723.

3,749,059.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE. JULY 31, 1973. AUS. 445683, BEL. 755061, CAN. 903579, FRA. 7029636, JAP. 48-25936, U.K. 1267888.

3,750,624.—APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC CONTINUOUS WEB MATERIAL. AUG. 7, 1973. AUS. 433381, BEL. 770250, CAN. 948843, FRA. 7126524, ITL. 948843, U.K. 1328313.

3,753,419.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPING APPARATUS. AUG. 21, 1973. AUS. 430772, BEL. 768788, CAN. 334540, FRA. 7122426, ITL. 928531, U.K. 1337485.

3,766,887.—DEVELOPING DEVICE FOR ELECTROSTATIC LATENT IMAGE. OCT. 28, 1973. AUS. 429869, BEL. 761227, CAN. 102437, FRA. 2075270, ITL. 919235, U.K. 1310092.

3,774,574.—DEVELOPMENT DEVICE FOR ELECTROPHOTOGRAPHY. NOV. 27, 1973. FRA. 7143873.
3,783,827.—LIQUID DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHY. JAN. 8, 1974. BEL. 777528, CAN. 949309, FRA. 7147339, ITL. 945720.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, JAP. 1348667, MEX. 120938.
3,788,930.—METHOD OF FIXING IMAGES OBTAINED BY LIQUID DEVELOPMENT IN ELECTROPHOTOGRAPHY. JAN. 29, 1974. BEL. 774763.
3,796,187.—APPARATUS FOR DEVELOPING CONTINUOUS ELECTROPHOTOGRAPHIC PHOTOSENSITIVE WEB MATERIAL. MAR. 12, 1974. BEL. 769412, CAN. 934541, FRA. 7123852, ITL. 934462, U.K. 1332534.
3,804,659.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS FOR ENHANCING THE QUALITY OF THE DEVELOPED IMAGE. APR. 16, 1974. FRA. 7144069, JAP. 49-26901.
3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974. U.K. 1310448.
3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974. JAP. 46-43198.
3,991,711.—ELECTROSTATIC DUPLICATING METHOD AND APPARATUS UTILIZING WET DEVELOPING. NOV. 16, 1976. FRA. 733636, GER. 2350429, JAP. 47-101120, U.K. 1,443,209.
4,029,826.—ELECTROSTATIC PRINTING METHOD. JUNE 14, 1977. FRA. 7434015, GER. P2448211.9, JAP. 48-112875, U.K. 43016-74.

Class 5E4

3,577,259.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES UTILIZING A TOWER-FREE ZONE. MAY 4, 1971. AUS. 418640, CAN. 871081, FRA. 1592038, JAP. 46-11633, U.K. 1252917.
3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971. CAN. 939733, JAP. 48-34774, U.K. 1261752.
3,597,368.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY CONTAINING YELLOW PIGMENT. AUG. 3, 1971. BEL. 719289, CAN. 846.122, FRA. 1578390, JAP. 46-10480, U.K. 1201134.

Class 5I1

3,537,427.—ELECTROSTATIC LATENT IMAGE DEVELOPING DEVICE. NOV. 3, 1930. BEL. 722040, JAP. 46-14440, U.K. 1239635.
3,607,342.—METHOD OF DEVELOPMENT OF ELECTROSTATIC IMAGES. SEPT. 21, 1971. BEL. 707253, FRA. 1555753, JAP. 44-9878, U.K. 1204548.
3,627,557.—LIQUID DEVELOPMENT BY REDUCING THE VISCOSITY OF THE DEVELOPER ON A ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971. CAN. 905230, U.K. 1303499.

Class 5J

3,713,422.—APPARATUS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE BY LIQUID DEVELOPMENT. JAN. 30, 1973. BEL. 764267, CAN. 932954, FRA. 7109086, GER. 763,992, U.K. 1341631.
3,750,624.—APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC CONTINUOUS WEB MATERIAL. AUG. 7, 1973. AUS. 433381, BEL. 770250, CAN. 948843, FRA. 7126524, ITL. 937783, U.K. 1328313.

Class 5J1

3,620,798.—DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE EMPLOYING NOVEM DEVELOPMENT ELECTRODE. NOV. 16, 1971. BEL. 709410, FRA. 1552425, U.K. 1186841.
3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972. CAN. 867698.
3,655,419.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPING PROCESS. APR. 11, 1972. AUS. 432643, BEL. 741.440, CAN. 914.518, FRA. 6938659, ITL. 880.593, U.K. 1287.903.
3,685,907.—ELECTROPHOTOGRAPHIC PROCESS. AUG. 22, 1972. AUS. 442703, BEL. 752387, CAN. 910132, FRA. 2-51297, ITL. 902170, U.K. 1292200.
3,783,827.—LIQUID DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHY. JAN. 8, 1974. BEL. 777528, CAN. 949309, FRA. 7147339, ITL. 945720.
3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974. JAP. 46-43198.

Class 5J2

3,774,574.—DEVELOPMENT DEVICE FOR ELECTROPHOTOGRAPHY. NOV. 27, 1973. FRA. 7143873.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, MEX. 120938, U.K. 1348667.

Class 5J3

3,566,834.—ELECTROPHOTOGRAPHIC DEVELOPING DEVICE. MAR. 2, 1971. AUS. 417201, BEL. 718329, FRA. 1578391, JAP. 48-31853, U.K. 1194789.
3,672,330.—APPARATUS FOR DEVELOPING A LATENT ELECTROSTATIC IMAGE. JUNE 27, 1972. BEL. 708760, FRA. 149128, U.K. 1192600.

Class 5J5

3,560,203.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. FEB. 2, 1971. FRA. 1604137, U.K. 1165038.
3,783,818.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. JAN. 8, 1974. BEL. 781515, FRA. 7211409, ITL. 950927, U.K. 1358450.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, MEX. 120938, U.K. 1348667.
3,981,268.—DEVICE FOR CONTROLLING ELECTRIC POTENTIAL APPLIED TO DEVELOPING ELECTRODE IN AN ELECTROPHOTOGRAPHIC DUPLICATOR. SEPT. 21, 1976. GER. P2526802.4, JAP. 49-47554, KOR. 3672, TIW. 6410621, U.K. 24745-75.

Class 5K

3,724,941.—ELECTROPHOTOGRAPHIC APPARATUS. APR. 3, 1973.
3,762,811.—METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 2, 1973.

Class 5M

3,620,798.—DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE EMPLOYING NOVEM DEVELOPMENT ELECTRODE. NOV. 16, 1971. BEL. 709410, FRA. 1552425, U.K. 1186841.
3,655,419.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPING PROCESS. APR. 11, 1972. AUS. 432643, BEL. 471.440, CAN. 914.518, FRA. 6938659, ITL. 880.593, U.K. 1287.903.
3,773,507.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS EMPLOYING A PRETONER. NOV. 20, 1973. AUS. 426720, BEL. 769893, CAN. 947812, FRA. 7124853, ITL. 934605, JAP. 49-5465, U.K. 1340947.

Class 5N

3,764,312.—ELECTROPHOTOGRAPHIC PROCESS. OCT. 9, 1973. FRA. 7146405, JAP. 49-26903.

Class 5N2B

4,020,192.—XEROGRAPHIC REPRODUCTION PROCESS AND TONER CARRIER FOR USE THEREIN. APR. 26, 1977. FRA. 7430644, GER. P2443013.1, JAP. 48-101085, U.K. 39509.

Class 5N5

3,941,898.—DEVELOPING METHOD UTILIZING PULVERIZED, COLORED, CROSSLINKED, VINYLIC POLYMER RESIN AS TONER. MAR. 2, 1976.

Class 5O

3,476,659.—ELECTROPHOTOGRAPHIC IMAGING AND COPYING PROCESS. NOV. 4, 1969. BEL. 684406, FRA. 1489929, ITL. 773333, JAP. 43-27579, U.K. 1159394.
3,565,613.—ELECTROLYTIC ELECTROPHOTOGRAPHY. FEB. 23, 1971. GER. 1597849, JAP. 44-13679, U.K. 1202409.

Class 5P

4,127,083.—DEVELOPER SEALING DEVICE FOR XEROGRAPHIC COPYING MACHINE. NOV. 28, 1978.

Class 6BI

3,791,643.—CHAIN DELIVERY PAPER FEEDING DEVICE. FEB. 12, 1974. JAP. 48-20232.
3,927,877.—PAPER FEED TRAY FOR USE WITH COPYING MACHINE AND THE LIKE. DEC. 23, 1975.

Class 6C

3,901,427.—COPY PAPER FEEDER. AUG. 26, 1975.

Class 6D

3,924,848.—PAPER FEED APPARATUS FOR GRIPPER-TYPE PAPER TRANSPORT DEVICE. DEC. 9, 1975.
3,924,849.—PAPER GRIPPING DEVICE FOR USE WITH A CHAIN DRIVEN PAPER CARRIAGE. DEC. 9, 1975.

Class 6H

3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972. CAN. 940546, U.K. 1275888.

Class 7C

3,764,207.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING SINGLE CHARGING MEANS FOR EFFECTING SIMULTANEOUS FUNCTIONS OF CHARGING AND FACILITATING TONER IMAGE TRANSFER. OCT. 9, 1973.

Class 7E1

3,716,360.—MOLTEN IMAGE TRANSFER IN ELECTROPHOTOGRAPHY. FEB. 13, 1973. BEL. 763191, FRA. 7105717, GER. 2108080, ITL. 919905, U.K. 1313059.

Class 7E3A

3,549,359.—COLOR ELECTROPHOTOGRAPHY EMPLOYING DYE TRANSFER FROM A DYE-CONTAINING PHOTOSENSITIVE LAYER TO AN IMAGE RECEIVING SHEET. DEC. 22, 1970. FRA. 1524473, GER. 1,572,341, JAP. 45-40159, U.K. 1,183,532.
3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924.951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

Class 8A

3,825,407.—HEATER HOLDING BRACKET FOR A HEAT FIXER IN A COPYING MACHINE OR THE LIKE. JULY 23, 1974.

Class 8AB

3,806,314.—FIXING APPARATUS FOR THERMOPLASTIC RECORDING. APR. 23, 1974.

Class 8A1B

3,818,185.—HEAT FUSION-BONDING APPARATUS FOR ELECTROPHOTOGRAPHY. JUNE 18, 1974.
3,916,256.—PROTECTIVE CIRCUIT IN A TEMPERATURE REGULATOR FOR THE THERMAL FIXING DEVICE OF A DUPLICATOR. NOV. 4, 1975.

Class 8A2

3,904,786.—PROCESS FOR FIXING IMAGES BY CONTACT HEATING IN A DUPLICATOR. SEPT. 9, 1975.
3,981,269.—FIXING DEVICE FOR ELECTROPHOTOGRAPHIC DUPLICATING MACHINES. SEPT. 21, 1976. GER. P2507365.8, JAP. 31159, KOR. 3389, U.K. 5395-75.

Class 8A2A

3,788,930.—METHOD OF FIXING IMAGES OBTAINED BY LIQUID DEVELOPMENT IN ELECTROPHOTOGRAPHY. JAN. 29, 1974. BEL. 774763.

Class 8B

3,647,773.—SUSPENSION POLYMERIZATION IN THE PRESENCE OF A METHYL STYRENE. MAR. 7, 1972. BEL. 727179, FRA. 2000527, JAP. 47-909, U.K. 1251434.

Class 8C

3,385,699.—PROCESS FOR PROCESSING ELECTROPHOTOSENSITIVE LAYERS. MAY 28, 1968. BEL. 651039, FRA. 1402385, HOL. 130806, SWD. 310458, U.K. 1072476.
3,740,249.—SOLVENT FIXING PROCESS. JUNE 19, 1973. JAP. 49-26591.

Class 9A

3,488,896.—PROCESS OF PUMICING A SURFACE. JAN. 13, 1970. FRA. 1,474,687, ITL. 782,665, JAP. 44-12197, U.K. 1,143,923.
3,936,183.—ELECTROPHOTOGRAPHIC COPYING MACHINE WITH IMPROVED CLEANING BLADE. FEB. 3, 1976.

Class 9A1

3,766,592.—DRUM CLEANING DEVICE FOR AN ELECTROPHOTOGRAPHIC DUPLICATOR. OCT. 23, 1973.

Class 9B3

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972. CAN. 917486, JAP. 48-8134, U.K. 1278858.
3,703,400.—DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. NOV. 21, 1972. AUS. 435816, BEL. 748.590, CAN. 898073, FRA. 7012445, GER. 2016586, ITL. 903950, U.K. 1251623.

Class 10A, 10E

3,922,662.—DETECTOR FOR USE WITH A DUPLICATOR OR THE LIKE FOR DETECTING INCORRECTLY ALIGNED DOCUMENTS. NOV. 25, 1975.

Class 14A5

3,937,883.—BRAKING CIRCUIT FOR USE WITH PHASE SYNCHRONIZING CIRCUITRY. FEB. 10, 1976.

Class 15

3,795,187.—IMPELLERS FOR IMPACT PRINTERS. MAR. 5, 1974.

Class 15C

4,058,800.—IMAGE PICKUP ELEMENT AND SYSTEM UTILIZING MAGNETIC BUBBLES. NOV. 15, 1977. JAP. P49-137738.
4,054,866.—CONVERSION ELEMENT AND SYSTEM UTILIZING MAGNETIC BUBBLES. OCT. 18, 1977. JAP. P50-077558.
4,151,599.1.—MAGNETIC BUBBLE DISPLAY UNITS. APR. 24, 1979.

Class 17B1

3,687,538.—APPARATUS FOR EXPOSING LATENT IMAGE MARGINS IN ELECTROPHOTOGRAPHIC COPYING APPARATUS. AUG. 29, 1972. CAN. 931204, U.K. 1350795.

Class 17D3

3,936,664.—METHOD AND APPARATUS FOR GENERATING CHARACTER PATTERNS. FEB. 3, 1976.

Class 18A

3,417,733.—APPARATUS FOR VACUUM COATING. DEC. 24, 1968. FRA. 1,415,251, GER. 1,521,238. JAP. 40-26402, U.K. 1,081,324.
3,730,711.—PHOTOCONDUCTIVE MATERIAL FOR ELECTROPHOTOGRAPHY. MAY 1, 1973. BEL. 754699, CAN. 925087, FRA. 754699, GER. 2040152, JAP. 48-32381, U.K. 1272720.
3,799,340.—REFINING PHOTOCONDUCTIVE PARTICLE. MAR. 26, 1974. BEL. 776110, CAN. 944204, FRA. 714325.

Class 18A1

3,589,928.—PROCESS FOR THE PRODUCTION OF A LIGHT SENSITIVE MATERIAL FOR ELECTROPHOTOGRAPHY. JUNE 29, 1971. BEL. 685072, FRA. 1500187, GER. 1,522,603, JAP. 44-23775, U.K. 1139532.
3,607,363.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE MATERIAL. SEPT. 21, 1971. U.K. 1210071.
3,625,747.—PHOTOCONDUCTIVE POWDERS AND A METHOD FOR PRODUCING THE SAME. DEC. 7, 1971.
3,634,333.—PROCESS FOR COATING ZINC OXIDE POWDER WITH CADMIUM SULFIDE. JAN. 11, 1972. BEL. 731056, CAN. 882.627, FRA. 2.005.849, GER. 1916761, JAP. 47-49616, U.K. 1215685.
3,682,825.—PROCESS FOR THE PRODUCTION OF ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. AUG. 8, 1972. AUS. 424258, BEL.

745390, CAN. 924165, FRA. 7003324, GER. 2004817, ITL. 887410, JAP. 48-7819, U.K. 1255762.

3,729,419.—LIQUID DEVELOPER. APR. 24, 1973. AUS. 451254, FRA. 71.09434, JAP. 48-43157, U.K. 1341627.

3,743,537.—METHOD OF MAKING ELECTROPHOTOGRAPHIC RECORDING MEMBER. JULY 3, 1973. AUS. 430736, ATR. 305766, BEL. 757.393, CAN. 928165, FRA. 7037234, ITL. 917004, JAP. 49-3846, U.K. 1269306.

3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973. AUS. 443292, CAN. 925743, JAP. 48-7820, U.K. 1284646.

3,803,011.—PROCESS FOR PREPARING 2, 3-DIHYDRO-1H,6H-1,5-BENZODIAZOCINE-2-ONE DERIVATIVE. APR. 9, 1974.

Class 18A2

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

Class 18A3

3,806,314.—FIXING APPARATUS FOR THERMOPLASTIC RECORDING. APR. 23, 1974.

3,661,572.—MANUFACTURING PROCESS FOR MANUFACTURING ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL. MAY 9, 1972. AUS. 429948, BEL. 754323, CAN. 754323, FRA. 7028557, GER. 2038762, ITL. 902691, U.K. 1305298.

Class 18B

3,548,035.—SUSPENSION POLYMERIZATION PROCESS. DEC. 15, 1970. FRA. 1559138, GER. 1720782, JAP. 45-40052, U.K. 1185775.

3,625,747.—PHOTOCONDUCTIVE POWDERS AND A METHOD FOR PRODUCING THE SAME. DEC. 7, 1971.

3,647,773.—SUSPENSION POLYMERIZATION IN THE PRESENCE OF METHYL STYRENE. MAR. 7, 1972. BEL. 727179, FRA. 2000527, JAP. 47-909, U.K. 1251434.

3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.

3,697,266.—ORGANIC PHOTOCONDUCTIVE MATERIALS FOR ELECTROPHOTOGRAPHY. OCT. 10, 1972. BEL. 761043, CAN. 915493, FRA. 2074451, ITL. 913992, JAP. 48-38429, U.K. 1323109.

3,716,505.—PROCESS FOR SUSPENSION POLYMERIZATION. FEB. 13, 1973. FRA. 2048682, GER. 2025104, JAP. 47-23406, U.K. 1316693.

Class 18C

3,622,515.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPER HAVING A PROTEOLYTIC ENZYME. NOV. 23, 1971. AUS. 436813, BEL. 732273, CAN. 896948, FRA. 2007.520, ITL. 867188, JAP. 47-17879, U.K. 1231544.

3,718,593.—PROCESS FOR THE PRODUCTION OF AN ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. FEB. 27, 1973. AUS. 438586, BEL. 745535, CAN. 924166, FRA. 7004034, ITL. 888743, JAP. 48-7822, U.K. 1255763.

3,740,249.—SOLVENT FIXING PROCESS. JUNE 19, 1973. JAP. 49-26591.

Class 18C2A1

3,704,119.—ELECTROPHOTOGRAPHIC PROCESS USING TONER OF SAME REFRACTIVE INDEX AS ORGANIC PHOTOCONDUCTIVE LAYER. NOV. 28, 1972. AUS. 433360, BEL. 754544, FRA. 7028556, ITL. 902771, JAP. 48-21054, U.K. 1321065.

Class 18C2A2

3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.

3,682,825.—PROCESS FOR THE PRODUCTION OF ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. AUG. 8, 1972. AUS. 424258, BEL. 745390, CAN. 924165, FRA. 7003324, GER. 2004817, ITL. 887410, JAP. 48-7819, U.K. 1255762.

Class 18C5A

3,597,368.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY CONTAINING YELLOW PIGMENT. AUG. 3, 1971. BEL. 719289, CAN. 846.122, FRA. 1578390, JAP 46-10480, U.K. 1201134.

3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATIN. JUNE 12, 1973. CAN. 921746, JAP. 47-30858, U.K. 1277723.

Class 20A3

3,753,419.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPING APPARATUS. AUG. 21, 1973. AUS. 430722, BEL. 768788, CAN. 334540, FRA. 7122426, ITL. 928531, U.K. 1337485.

3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974. U.K. 1310448.

Class 20B3

3,544,458.—METHOD OF FILTERING. DEC. 1, 1970. BEL. 732578, CAN. 888335.

Class 20C

3,707,139.—LIQUID TYPE ELECTROPHOTOGRAPHY DEVELOPING APPARATUS. DEC. 26, 1972. BEL. 756409, CAN. 918413, FRA. 7034577, GER. 1314865.

Class 20C2

3,753,466.—AUTOMATIC FIRE EXTINGUISHER IN ELECTROPHOTOGRAPHIC COPYING MACHINE OR THE LIKE. AUG. 21, 1973. U.K. 1334579.

Class 20C4

3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972. CAN. 940546, U.K. 1275888.

Class 20D

3,653,292.—AUTOMATIC CONTOUR TRACING DEVICE. APR. 4, 1972. FRA. 7204547, GER. 2033094, U.K. 1295128.

3,825,407.—HEATER HOLDING BRACKET FOR A HEAT FIXER IN A COPYING MACHINE OR THE LIKE. JULY 23, 1974.

Class 20D1

3,791,643.—CHAIN DELIVERY PAPER FEEDING DEVICE. FEB. 12, 1974. JAP. 48-20232.

Class 20G

3,795,187.—IMPELLERS FOR IMPACT PRINTERS. MAR. 5, 1974.

Class 20I

3,341,664.—METAL DRAWING APPARATUS. APR. 24, 1974.

Class 24A1

4,212,017.—DEFLECTION ELECTRODE ASSEMBLY FOR MULTI-NOZZLE INK JET PRINTERS. JULY 8, 1980.

Class 25A4

3,952,167.—ELECTROMAGNETIC COUPLER FOR USE WITH A TELEPHONE SET. APR. 20, 1976.

Class 25C2

3,341,631.—CIRCUIT INTERRUPTER. APR. 24, 1974. BEL. 764267, CAN. 932954, FRA. 7109086.

3,846,647.—TRIGGER CIRCUIT FOR USE WITH MULTIVIBRATORS. NOV. 5, 1974.

Class 25C4

3,838,344.—FREQUENCY MULTIPLYING CIRCUIT. SEPT. 24, 1974.

Class 25C5

3,936,675.—REFERENCE POINT POTENTIAL COMPENSATING CIRCUIT FOR USE WITH PHASE CONTROLLER. FEB. 3, 1976.

Class 27D

3,779,206.—APPARATUS FOR SCRAPING LIQUID OFF OF SHEET MATERIAL. DEC. 18, 1973.

Class 32

3,813,262.—RESIN-IMPREGNATED TISSUE OVERLAYS. MAY 28, 1974. BEL. 777312, FRA. 7146406, ITL. 945655.

Class 32B

3,273,450.—DATA PROCESSING APPARATUS. NOV. 15, 1963. FRA. 1384061, GER. 1449563, GRB. 1048048, JAP. 629392.

Xerox Patents

Class 1

4,043,549.—IMPACT FEEDER. AUG. 23, 1977

4,060,105.—TONER LOADING APPARATUS WITH REPLENISHING SUPPLY CONTAINER. NOV. 29, 1977

4,109,903.—FLUIDIC FEEDING OF DOCUMENTS TO AN EXPOSURE STATION. AUG. 29, 1978

Class 1A

3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436, FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.

3,954,951.—PREPARATION OF RED AMORPHOUS SELENIUM. MAY 4, 1976.

3,961,954.—ACID SENSITIZED CHARGE TRANSFER COMPLEXES AND CYCLIC ELECTRSTATOGRAPHC IMAGNG METH-ACID SENSITIZATN. JUNE 8, 1976. CAN. 1002366.

4,009,249.—PREPARATION OF RED AMORPHOUS SELENIUM. FEB. 22, 1977.

4,072,522.—METHOD OF TREATING PHOTOCONDUCTIVE ZINC OXIDE. FEB. 7, 1978.

4,078,924.—IMAGING SURFACE SMOOTHING WITH ROUGHENED FOIL NICKEL. MAR. 14, 1978.

4,099,969.—COATING METHOD TO IMPROVE ADHESION OF PHOTOCONDUCTORS. JULY 11, 1978.

Class 1A 1

3,607,261.—INORGANIC CRYSTALLINE BINDERS FOR ELECTROPHOTOGRAPHIC PLATES. SEPT. 21, 1971.

3,850,631.—PHOTOCONDUCTIVE ELEMENT WITH A POLYVINVLIDENE FLUORIDE BINDER. NOV. 26, 1974.

3,928,036.—FLEXIBLE XEROGRAPHIC PHOTORECEPTOR ELEMENT. DEC. 23, 1975.

3,981,728.—XEROGRAPHIC IMAGING MEMBER HAVING HEXAGONAL SELENIUM IN INTERLOCKING CONTINUOUS PATHS. SEPT. 21, 1971.

Class 1A 1A

3,174,855.—METHOD FOR A PRODUCTION OF A XEROGRAPHIC PLATE. MAR. 23, 1965.

3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.

3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.

3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.

3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.

3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.

3,532,496.—XRGRPHC PLTS AND PROCS EMPLYNG HMGNUS DISPRSNS OF VTREOUS SLNIUM AND SNSTZNG DYES AS PHTCNDCTV LAYER. OCT. 6, 1970.

3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.

3,645,729.—METHOD OF TRANSFERRING ELECTROSTATIC LATENT IMAGES USING MULTIPLE PHOTOCONDUCTIVE LAYERS. FEB. 29, 1972.

3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.

3,930,853.—ACCELERATING AGING METHOD FOR SELENIUM ARSENIC PHOTOCONDUCTORS. JAN. 6, 1976.

4,013,463.—PHOTORECEPTOR FABRICATION UTILIZING AC ION PLATING. MAR. 22, 1977.

4,150,029.—SELENIUM AND SELENIUM ALLOY EVAPORATION TECHNIQUE. MAR. 29, 1977.

4,016,310.—COATR HRDWR AND METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.

4,109,902.—PHOTORECEPTOR FABRICATION. APR. 26, 1977.

4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.

4,072,518.—METHOD OF MAKING TRIGONAL SELENIUM INTERLAYERS BY GLOW DISCHARGE. FEB. 7, 1978.

4,075,013.—ELECTROPHOTOCHEMICAL PREPARATION OF SELENIUM PHOTOCONDUCTIVE MEMBERS. FEB. 21, 1978.

4,098,655.—METHOD FOR FABRICATING A PHOTORECEPTOR. JULY 4, 1978.

Class 1A 1B

3,312,548.—XEROGRAPHIC PLATES. APR. 4, 1967. BEL. 0691217, CAN. 0819658, FRA. 1505803, GRB. 1165579, JAP. 0650232.

3,355,289.—CYCLICAL XEROGRAPHIC PROCESSD UTILIZING A SELENIUM-TELLURIUM XEROGRAPHIC PLATE. NOV. 28, 1967.

3,427,157.—XEROGRAPHIC PROCESS UTILIZING A PHOTOCONDUCTIVE ALLOY OF THALLIUM IN SELNIUM. FEB. 11, 1969. CAN. 0834085, FRA. 1461161, GRB. 1132993, HOL. 0150924, ITL. 0749553, JAP. 0534762, MEX. 0085232.

3,489,560.—PHOTOCONDUCTIVE LAYR COMPRISN SELENIUM COMPOUND AND SOLID HYDROPHOBIC METL SALT OF A FATTY ACID. JAN. 13, 1970. BEL. 0711297, CAN. 0871632, FRA. 1544448, GRB. 1203237, ITL. 0815227, JAP. 0632160.

3,490,903.—ALLOYS OF ANTIMONY AND SELENIUM USED IN PHOTOCONDUCTIVE ELEMENTS. JAN. 20, 1970. AUS. 0412949, CAN. 0871074, FRA. 1533536, GRB. 1185389, ITL. 0805955, JAP. 0626127, SWD. 0318193.

3,511,649.—PROCESS OF REDUCING FATIGUE IN PHOTOCONDUCTIVE GLASSES. MAY 12, 1970. GRB. 1193472, JAP. 0604152.

3,524,745.—PHOTOCONDUCTIVE ALLOY OF ARSENIC ANTIMONY AND SELENIUM. AUG. 18, 1970. ARG. 0164055, AUS. 0410443, BEL. 0709132, CAN. 0884810, CHL. 0024255, FRA. 1550902, GRB. 1209971, IND. 0113988, ITL. 0833508, JAP. 9124370, LXB. 0055231, MEX. 0108993, NOR. 0127943, NZL. 0151243, PRU. 0009904, PTG. 0048919, SAF. 0680228, SPN. 0349235, STZ. 0495573, SWD. 0328189, URG. 0009683.

3,645,729.—METHOD OF TRANSFERRING ELECTROSTATIC LATENT IMAGES USING MULTIPLE PHOTOCONDUCTIVE LAYERS. FEB. 29, 1972.

3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.

3,709,683.—INFRARED SENSITIVE IMAGE RETENTION PHOTORECEPTOR. JAN. 9, 1973.

3,874,917.—METHOD OF FORMING VITREOUS SEMICONDUCTORS BY VAPOR DEPOSITING BISMUTH AND SELENIUM. APR. 1, 1975.

4,015,029.—SELENIUM AND SELENIUM ALLOY EVAPORATION TECHNIQUE. MAR. 29, 1977.

4,016,310.—COATR HRDWR AND METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.

4,019,902.—PHOTORECEPTOR FABRICATION. APR. 26, 1977.

4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.

4,099,969.—COATING METHOD TO IMPROVE ADHESION OF PHOTOCONDUCTORS. JULY 11, 1978.

4,121,981.—ELECTROCHEMICAL METHOD FOR FORMING A SELENIUM-TELLURIUM LAYER IN A PHOTORECEPTOR. OCT. 24, 1978

4,126,457.—EVAPORATION TECHNIQUE FOR PRODUCING TEMPERATURE PHOTORECEPTOR ALLOYS. NOV. 21, 1978. CAN 1046864.

4,187,104.—ELECTROPHOTOGRAPHIC PHOTORECEPTOR. FEB. 5, 1980.

Class 1A 1C

3,121,006.—PHOTO-ACTIVE MEMBER FOR XEROGRAPHY. FEB. 11, 1964. ARG. 0147758, BEL. 0656892, CAN. 0674311, CHL. 0020455, CLB. 0014118, ECD. 0000029, GUA. 0001696, PRU. 0009656, TRK. 0012835, URG. 0006526, VZL. 0016353.

3,121,007.—PHOTO-ACTIVE MEMBER FOR XEROGRAPHY. FEB. 11, 1964.

3,140,174.—PROCESS FOR OVERCOATING A XEROGRAPHIC PLATE. JULY 7, 1964. GRB. 0960871.

3,151,982.—XEROGRAPHIC PLATE. OCT. 6, 1964. ARG. 0149584, ATR. 0247148, AUS. 0275834, BEL. 0630478, BRA. 0088013, CAN. 0879017, DNK. 0116787, FRA. 1359402, GER. 1497054, GRB. 1049872, GRK. 0026268, HOL. 0139212, IND. 0086999, ISR. 0018877, ITL. 0701505, JAP. 0489512, LXB. 0043461, MEX. 0081663, NOR. 0108058, NZL. 0134420, PTG. 0040700, SAF. 0001331, SPN. 0286492, STZ. 0450173, SWD. 0313998.

3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.

3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.

3,519,420.—METHOD OF CHARGING A ZINC OXIDE PHOTOCONDUCTIVE LAYER WITH A POSITIVE CHARGE. JULY 7, 1970.

3,522,040.—PHOTOSENSITIVE INSULATING MATERIAL. JULY 28, 1970. CAN. 0884808, GRB. 1171910, JAP. 0552966.

3,941,594.—ELECTROPHOTOGRAPHIC ELEMENT WITH ZNO AND TIO2. MAR. 2, 1976.

3,969,113.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY CONTAINING TITANIUM OXIDE AND A CADMIUM PIGMENT. JULY 13, 1976.

3,975,306.—METHOD FOR IMPROVING THE PHOTOINDUCED DISCHARGE CHARACTERISTICS OF CERTAIN CADMIUM CHALOCOGENIDE. AUG. 17, 1976.

Class 1A 1E

3,469,978.—PHOTOSENSITIVE ELEMENT. SEPT. 30, 1969. CAN. 0872173, GRB. 1171909, JAP. 0552967.

Class 1A 1F

3,288,604.—IMAGING METHOD USING AN ELEMENT HAVING A GLASS OVERCOATING. NOV. 29, 1966. CAN. 0815735.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,507,646.—ELECTROPHOTOGRAPHIC PROCESS USING A SINGLE PHASE PHOTOCONDUCTIVE GLASS IMAGING LAYER. APR. 21, 1970. ARG. 0164449, AUS. 0416137, BEL. 0691757, CAN. 0818383, FRA. 1511172, GER. 1522713, GRB. 1167520, ITL. 0787661, JAP. 0567233, MEX. 0105237, SPN. 0334896, STZ. 0472707, SWD. 0331793, VZL. 0024006.

3,565,713.—METHOD OF FORMING A CERAMIC IMAGE ON A CERAMIC SUBSTRATE. FEB. 23, 1971.

Class 1A 2

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,770,428.—ORGANIC PHOTOCONDUCTIVE MATERIAL. NOV. 6, 1973.

3,850,631.—PHOTOCONDUCTIVE ELEMENT WITH A POLYVINVLIDENE FLUORIDE BINDER. NOV. 26, 1974.

3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. FRA. 740836, GRB. 1414158, ITL. 1010695, TIW. 0008534.

3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975.

3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.

3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.

3,915,704.—PHOTOINDUCED ACID CATALYZED DEGRADATION OF DEGRADABLE POLYMERS. OCT. 28, 1975.

3,917,483.—PHOTOINDUCED ACID CATALIZED DEPOLYMERIZATION OF DEGRADABLE POLYMERS. NOV. 4, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.

3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976. FRA. 7403086, GRB. 1446966.

3,978,029.—PHOTOCONDUCTIVE COMPOSITIONS AND IMAGING MEMBERS AND METHODS EMPLOYING SAME. AUG. 31, 1976. ARG. 0206212, BEL. 0816552, FRA. 7422479, SAF. 0744129.

3,981,848.—PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHODS EMPLOYING SAME. SEPT. 21, 1976. ARG. 0206211, ATR. 0332734, FRA. 7422484.

4,043,812.—A PROCESS FOR PREPARATION OF 2-ANTHRYL & SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND POLY. JUL 23, 1977. BEL. 822305, FRA. 7527053, STZ. 32598.

4,050,934.—ELECTRON ACCEPTOR MONOMERS & POLYMERS. SEPT. 27, 1977.

4,056,391.—METHOD FOR ENHANCING SOLID SOLUTION STABILITY OF ELECTRON ACCEPTOR MOLECULES AND ELECTROPHO. NOV. 1, 1977.

4,117,072.—PROCESS FOR ENHANCEMENT OF MECHANICAL PROPERTIES OF PHOTOCONDUCTIVE POLYMERS. SEPT. 26, 1978. FRA. 7531736. GRB. 1469371.

4,117,239.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS & POLYMERS. SEPT. 26, 1978. BEL. 822305.

4,153,802.—ELECTRON ACCEPTOR MONOMERS AND POLYMERS. MAY 8, 1979. FRA. 7626102.

4,161,490.—ELECTRON ACCEPTOR MONOMERS. JULY 17, 1979. FRA. 7626102.

Class 1A 2A

3,357,989.--METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-SEE D2167 FOR RE27117. DEC. 12, 1967. CAN. 0860929, FRA. 1508173, GRB. 1169901, ITL. 0787592, JAP. 0560090, MEX. 0101543.

3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.

3,442,781.—PHOTOELECTROPHORETIC AND XEROGRAPHIC IMG. PROC. EMPL. TRIPHENODIOXAZINES AS ELECTRIC. PHOTOSENSIT. MAY 6, 1969. AUS. 0445582, BEL. 0743894, CAN. 0855152, GRB. 0175452, JAP. 0611634.

3,445,225.—ELECTROPHOTOGRAPHIC IMAGING PROCESS. MAY 20, 1969. CAN. 0846121.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. AUS. 0445639, BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,482,970.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS USING NAPHTHYLAZO COMPOUNDS AS THE PRIMARY PHOTOCONDUCTOR. DEC. 9, 1969. ATR. 0279351, AUS. 0453397, BEL. 0742978, CAN. 0869486, GRB. 1296390, ITL. 0878843, JAP. 0725059.

3,607,261.—INORGANIC CRYSTALLINE BINDERS FOR ELECTROPHOTOGRAPHIC PLATES. SEPT. 21, 1971.

3,615,409.—ELCTROPHOTOGRPHC PLATE AND PROCESS EMPLOYING A PHOTODNDCTV PIGMNT OF GENERAL FORMULA R2 N4 S3. OCT. 26, 1971.

3,640,710.—PHTHALOCYANINE PHOTOCONDUCTIVE ELEMENTS CONTAINING MULTIPLE BINDER MATERIALS. FEB. 8, 1972. ARG. 0184666, ATR. 0328861, AUS. 0456430, BEL. 0760751, CAN. 0933012, FRA. 7047636, GRB. 1333605, ITL. 0913999, PNM. 0002243, STZ. 0554550, SWD. 0365878, TIW. 0006738, USR. 0450420, VZL. 0032928.

3,672,979.—METHOD OF PRODUCING A PHTHALOCYANINE PHOTOCONDUCTIVE LAYER. JUNE 27,

1972. ARG. 0184673, AUS. 0457271, BEL. 0761135, CAN. 0951697, FRA. 7047702, GRB. 1334060, ITL. 0914074, JAP. 0753795, MEX. 0119529, PNM. 0002191, SPN. 0386759, STZ. 0571731, TIW. 0007180, VZL. 0032789.

3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, CAN. 0996931, GRB. 1396922, ITL. 0955644, MEX. 0128928.

3,789,216.—PHOTODETECTION DEVICE AND METHOD COMPRISING PHTHALOCYANINE. JAN. 29, 1974.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ 0028515, VZL. 003956.

3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,951,654.—MTHD ENHNCMT RATE AND EFFICIENCY OF PHOTODSCHG OF ELCTRPHGRIC IMAGING MEMBERS COMPRSNG PHTHALOCYA. APR. 20, 1976.

3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436. FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.

3,989,860.—REPAIR TECHNIQUE FOR PHOTORECEPTOR. NOV. 2, 1976.

4,006,017.—PHOTOCONDUCTIVE COMPOSITION ARTICLE AND PROCESS. FEB. 1, 1977.

4,012,122.—LIQUID CRYSTALLINE PLATEN FOR A ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 15, 1977.

4,046,563.—PHOTOCONDUCTIVE COMPOSITION CONTAINING A TRICYANOPYRENE, ARTICLE AND PROCESS OF USE. SEPT. 6, 1977. FRA. 7509147.

4,055,420.—SINGLE PHASE ORGANIC PHOTOCONDUCTIVE COMPOSITION. OCT. 25, 1977.

4,072,519.—PHOTOCONDUCTIVE COMPOSITION, AND ELEMENT. FEB. 7, 1978. FRA. 7509146.

4,092,161.—INORGANIC PHOTOCONDUCTORS WITH PHENYL SUBSTITUTED IMAGE TRANSPORT MATERIALS. MAY 30, 1978. AUS. 462805, BEL. 790689, CAN. 1007922, FRA. 7411475, GRB. 1462986, ITL. 969902, MEX. 133728, SPN. 407984, STZ. 28515, VZL. 33956.

4,122,114.—1-TRICYANOINYLPYRENE. OCT. 24, 1978.

Class 1A 2B

3,408,182.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0847805, FRA. 1463743, GER. 1522679, GRB. 1137665, ITL. 0755290, JAP. 0572185, MEX. 0107318.

3,408,183.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0819066, FRA. 1463745, GER. 1522676, GRB. 1126048, ITL. 0755287, JAP. 0727091, MEX. 0106758.

3,408,184.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0818382, FRA. 1463727, GRB. 1137664, ITL. 0755289, JAP. 0726382, MEX. 0105835.

3,408,185.—ELECTROPHOTOGRAPHIC MATERIALS AND METHOD EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0848383, FRA. 1463728, GER. 1645192, GRB. 1137476, ITL. 0755291, MEX. 0106763.

3,408,186.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT.29,1968. CAN. 0846736, FRA. 1463746, GRB. 1138629, ITL. 0755288, JAP. 0569483, MEX. 0106589.

3,408,187.—ELECTROPHOTOGRAPHIC MATER AND METH EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0867298, GER. 1522721, GRB. 1163097, JAP. 0797719.

3,408,188.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS COMPRISING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0869485, GRB. 1183516, JAP. 0797720.

3,408,189.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968.

3,408,190.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0850019, GER. 1302772, GRB. 1182172.

3,536,482.—ELECTROPHOTOGRPHC IMG SYS INCL A HALOGEN TREATMENT STOP FOR MAKING BCKGRND AREAS TRANSPARENT. OCT. 27, 1970.

3,607,258.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. SEPT. 21, 1971. CAN. 0871634, GRB. 1174171.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515, VZL. 0033956.

3,879,201.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. APR. 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,957,725.—AN ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER. MAY 18, 1976. ITL. 1010430.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.

4,013,623.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAR. 22, 1977.

4,025,710.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAY 24, 1977.

4,033,769.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. JULY 5, 1977.

4,046,564.—ELECTROPHOTOGRAPHIC IMAGING MEMBERS WITH PHOTOCONDUCTIVE LAYER CONTAINING ELECTRON ACCEPTOR. SEPT. 6, 1977.

4,062,886.—FLUORENONE CARBOXYLE ACID ESTERS. DEC. 13, 1977. FRA. 7621895.

4,069,046.—POLYMERIZED VINYL CARBAZOLES SENSITIZED BY NITRO-SUBSTITUTED 9-DICYANOMETHYLENE FLUORENES. JAN. 17, 1978.

4,075,012.—INTRACHAIN CHARGE TRANSFER COMPLEXES USE IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 21, 1978.

4,092,161.—INORGANIC PHOTOCONDUCTORS WITH PHENYL SUBSTITUTED IMAGE TRANSPORT MATERIALS. MAY 30, 1978.

AUS. 462805, BEL. 790689, CAN. 1007922, FRA. 7411475, GRB. 1462986, ITL. 969902, MEX. 133728, SPN. 407984, STZ. 28515, VZL. 33956.

4,098,984.—ELECTRON ACCEPTOR POLYMERS. JULY 4, 1978.

4,116,691.—ELECTROPHOTOGRAPHIC IMAGING MEMBER OF MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS. SEPT. 26, 1978.

4,122,113.—9-FLUORENYL ACRYLATES. OCT. 24, 1978.

4,129,581.—MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS-PROCESS FOR PREPARATION AND USE. DEC. 12, 1978.

4,143,225.—HOMOPOLYMERS OF A FLUORENONE DERIVATIVE HAVING PENDANT ELECTRON ACCEPTOR GROUPS. MAR. 6, 1979.

4,172,933.—MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS—PROCESS FOR PREPARATION AND USE. OCT. 30, 1979.

Class 1A 2C

3,451,811.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. JUNE 24, 1969. CAN. 0828692, JAP. 0573734.

3,660,086.—ELCTRPHTGRPC PLATE AND PROCS EMPLYNG INORGNC PHOTCNDCTV MATRL W/PHOTOCHROMIC SENSITIVE AGENT. MAY 2, 1972.

3,961,948.—PHOTOCHROMIC IMAGING METHOD. JUNE 8, 1976.

Class 1A 2D

3,518,081.—IMAGE FORMATION AND DEVELOPMENT - REISSUED D 857R. JUNE 30, 1970. CAN. 0801270, GRB. 1085573.

RE29,357.—IMAGE FORMATION AND DEVELOPMENT—REISSUE OF 3,518,081—D 857. AUG. 16, 1977. CAN. 801270, GRB. 1085573.

Class 1A 3

3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.

3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.

3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.

3,393,070.—XEROGRAPHIC PLATE WITH ELECTRIC FIELD REGULATING LAYER. JULY 16, 1968. CAN. 0871308, GER. 1490987, GRB. 1141452, JAP. 0764435, MEX. 0105660.

3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.

3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, SPN. 0379204, SWD. 0335063, USR. 0448658, VZL. 0029780.

3,723,110.—ELECTROPHOTOGRAPHIC PROCESS. MAR. 27, 1973.

3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.

3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.

4,043656.—TRANSPARENCY COPYING MACHINE. AUG. 23, 1977.

Class 1A 4

3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.

3,256,089.—MASKED PLATE XEROGRAPHY. JUNE 14, 1966.

3,288,604.—IMAGING METHOD USING AN ELEMENT HAVING A GLASS OVERCOATING. NOV. 29, 1966. CAN. 0815735.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,434,832.—XEROGRAPHIC PLATE COMPRISING A PROTECTIVE COATING OF A RESIN MIXED WITH A METALLIC STEARATE. MAR. 25, 1969. CAN. 0835883, FRA. 1454672, GER. 1497223, GRB. 1128156, ITL. 0772535, JAP. 0545757, MEX. 0085603.

3,488,189.—ELECTROPHOTOGRAPHIC RECORDING MEMBER HAVING SOLID CRYSTALLINE PLASTICIZR AVAILBL AT IMGNG SURFA. JAN. 6, 1970. CAN. 0866700, FRA. 1506810, GRB. 1183205, ITL. 0788976, JAP. 0570734, MEX. 0108241.

3,607,258.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. SEPT. 21, 1971. CAN. 0871634, GRB. 1174171.

3,816,115.—METHOD FOR FORMING A PLURALITY OF ELECTROSTATIC LATENT IMAGES ON AN ELECTROPHOTOGRAPHIC PLATE. JUNE 11, 1974.

3,860,421.—N-ALKYL MORPHOLINE TREATMENT OF A SELENIUM-CONTAINING PHOTOCONDUCTIVE LAYER. JAN. 14, 1975.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515.

3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.

3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.

3,957,725.—AN ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER. MAY 18, 1976. ITL. 1,010,430.

4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.

4,027,964.—IMAGING METHOD AND APPARATUS. JUNE 7, 1977. ARG. 0190535, BEL. 0777714, CAN. 0949825, FRA. 7201000, GRB. 1374501, ITL. 0946355, MEX. 0124981.

4,045,413.—POSSIBLE ACTIVE MATRIX POLYMERS. AUG. 30, 1977. FRA. 7432710.

4,063,943.—ELECTROSTATOGRAPHIC IMAGING METHOD. DEC. 20, 1977.

4,063,945.—ELECTROSTATOGRAPHIC IMAGING METHOD. DEC. 20, 1977.

4,092,161.—INORGANIC PHOTOCONDUCTORS WITH PHENYL SUBSTITUTED IMAGE TRANSPORT MATERIALS. MAY 30, 1978.AUS. 462805, BEL. 790689, CAN. 1007922, FRA. 7411475, GRB. 1462986, ITL. 969902, MEX. 133728, SPN. 407984, STZ. 28515, VZL. 33956.

Class 1A 5

3,411,903.—XEROGRAPHIC METHOD AND PLATE COMPRISING PHOTOCONDUCTIVE INSULATING FIBERS. NOV. 19, 1968. ARG. 0149620, ATR. 0270379, AUS. 0410718, BEL. 0672668, BRA. 0084119, CAN. 0834669, CHL. 0023648, CLB. 0014943, DNK. 0120577, EGR. 0055545, FRA. 1464792, GER. 1497224, GRB. 1084024, GRK. 0031509, IND. 0102560, ISR. 0024632, ITL. 0734376, JAP. 0724233, LXB. 0049849, MEX. 0098487, NOR. 0122817, NZL. 0143432, PLO. 0067959, PLP. 0004547, PNM. 0001533, PRU. 0008384, PTG. 0044879, SAF. 0656280, SPN. 0319795, STZ. 0458076, SWD. 0308250, THL. 1084024, TIW. 0003735, URG. 0006624, VZL. 0023996.

3,947,184.—IMAGING METHOD. MAR. 30, 1976.

3,972,718.—ELECTROSTATOGRAPHIC GRAVURE MEMBER. AUG. 3, 1976.

Class 1A 6

3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.

3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.

3,684,500.—METHOD OF FORMING PERMANENT ELECTROSTATIC IMAGE WITH TWO-LAYERED PHOTORECEPTOR. AUG. 15, 1972.

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.

3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.

3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.

3,994,791.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. NOV. 30, 1976.

4,049,449.—METHOD FOR FORMING AN ELECTROPHOTOGRAPHIC MEMBER. SEPT. 20, 1977.

Class 1B

3,730,453.—EARLY END-OF-TAPE DETECTION. MAY 1, 1973. CAN. 0939052, GRB. 1354581.

3,889,292.—APPARATUS FOR MAKING MULTIPLE ALPHANURMIC COPIES OF A BINARY CODED MESSAGE. JUNE 10, 1975. CAN. 0986572.

4,032,746.—CONTROL SYSTEM FOR A FUSING APPARATUS. JUNE 28, 1977.

4,076,858.—ELECTROSTATIC COPYING PROCESS WITH CHARGING OF THE ORIGINAL. FEB. 28, 1978.

Class 1B 1

3,244,546.—ELECTROSTATIC IMAGE REPRODUCTION. APR. 5, 1966. CAN. 0847532, GRB. 1040371, JAP. 0477223.

3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.

3,518,698.—IMAGING SYSTEM. JUNE 30, 1970. CAN. 0905481, FRA. 1542838, GRB. 1200804, JAP. 0604154, MEX. 0099911.

3,561,957.—ELECTROPHOTOGRAPHIC PROCESS USING A HIGH INTENSITY ELECTROMAGNETIC RADIATION SOURCE. FEB. 9, 1971. CAN. 0914266, GRB. 1207361.

3,631,507.—METHOD OF REDISTRIBUTING CHARGE ON A DIELECTRIC MEDIUM. DEC. 28, 1971.

3,677,750.—PHOTOELECTROSOLOGRAPHIC IMAGING. JULY 18, 1972. GRB. 1326934.

3,686,678.—DUAL MODE ELECTROSTATIC PRINTING. AUG. 22, 1972. BEL. 0747125, CAN. 0952574, FRA. 7007650, GRB. 1297996, JAP. 0753534.

3,693,185.—ELECTROSTATIC RECORDING HEAD AND METHOD OF MANUFACTURE. SEPT. 19, 1972.
3,719,481.—ELECTROSTATOGRAPHIC IMAGING PROCESS. MAR. 6, 1973.
3,729,123.—PRINTING MACHINE AND METHOD. APR. 24, 1973. CAN. 0959532, FRA. 7142517, GRB. 1348014.
3,729,334.—IMAGING PROCESS. APR. 24, 1973.
3,793,107.—ELECTROSTATIC RECORDING HEAD AND METHOD OF MANUFACTURE. FEB. 19, 1974.
3,829,185.—HOUSING ASSEMBLY FOR ELECTROSTATIC PRINTING MACHINE. AUG. 13, 1974.
3,854,942.—TRANSPARENCY FOR MULTI-COLOR ELECTROSTATIC COPYING. DEC. 17, 1974.
3,859,960.—PRINTING MACHINE WITH ELECTROSTATIC WEB DEVELOPING APPARATUS. JAN. 14, 1975. CAN. 0959532, FRA. 7142517, GRB. 1348014.
3,937,177.—ELECTROSTATIC PRINTING MACHINE WITH IMPROVED TONER FOUNTAIN AND RECOVERY, FEB. 10, 1976 .
3,985,666.—PLASTIC MATERIALS MIXED WITH POLAR GROUP CONTAINING MATERIALS. OCT. 12, 1976. ARG. 0195541, BEL. 0781970, CAN. 0976742, FRA. 7213873, GRB. 1396141, ITL. 0951326, MEX. 0126158, VZL. 0032937.
4,042,939.—PRINTER/PLOTTER STYLE SYSTEM FOR CONFINED INSTALLATION AND METHOD. AUG. 16, 1977.

Class 1B 2

3,196,013.—XEROGRAPHIC INDUCTION RECORDING WITH MECHANICALLY DEFORMABLE IMAGE-FORMATION IN A DEFORMABLE LAY. JULY 20, 1965. CAN. 0778520, FRA. 1360084, GER. 1253581, ITL. 0711488, JAP. 0649672.
3,321,308.—XEROGRAPHIC INDUCTION RECORDING. MAY 23, 1967. CAN. 0778521, FRA. 1393821, GRB. 1049903, ITL. 0801906, JAP. 0537660.
3,551,146.—INDUCTION IMAGING SYSTEM. DEC. 29, 1970.
3,703,376.—INDUCTION SYSTEM. NOV. 21, 1972. ARG. 0190247, MEX. 0123032.
3,738,855.—INDUCTION IMAGING SYSTEM. JUNE 12, 1973.
3,778,841.—INDUCTION IMAGING SYSTEM. DEC. 11, 1973. ARG. 0190247, MEX. 0123032.
3,953,206.—IMAGING METHOD. APR. 27, 1976.
4,050,804.—LIQUID INK IMAGING SYSTEM. SEPT. 27, 1977.
4,056,314.—LIQUID INK IMAGING SYSTEM. NOV. 1, 1977.
4,076,405.—LIQUID INK IMAGING SYSTEM. FEB. 28, 1978.
4,197,331.—A NOVEL ELECTROSTATIC IMAGING SYSTEM. APR. 8, 1980.

Class 1B 3

3,145,655.—EQUIPOTENTIAL XEROPRINTING MEMBER AND PROCESS OF PRINTING THERE WITH. AUG. 25, 1964. CAN. 0784647, GER. 1287095, GRB. 0958964, JAP. 0591209.
3,160,091.—HIGH SPEED XEROPRINTER AND METHOD THEREFOR. DEC. 8, 1964. GRB. 0978349.
3,318,698.—XEROPRINTING REPRODUCTION. MAY 9, 1967. CAN. 0790236, FRA. 1394421, GRB. 1055323, ITL. 0801547, JAP. 0504497.
3,515,584.—XEROPRINTING MASTER. JUNE 2, 1970. CAN. 0882600, GRB. 1204246, JAP. 0659019.
3,547,627.—LITHOGRPHC PRINTG MASTER AND METHOD EMPLOYING A CRYSTALLINE PHOTOCONDUCTIVE IMAGING LAYER. DEC. 15, 1970.
3,574,614.—PROCESS OF PREPARING MULTIPLE COPIES FROM A XEROPRINTING MASTER. APR. 13, 1971. ATR. 0305769, AUS. 0448396, BEL. 0743660, CAN. 0882599, FRA. 6944513, GRB. 1209060, ITL. 0879118, JAP. 0713808.
3,967,818.—DUPLICATING SYSTEM. JULY 6, 1976.
4,047,945.—XEROPRINTING MASTER AND PROCESS. SEPT. 13, 1977.

Class 1B 4A

3,653,891.—FORMS OVERLAY TECHNIQUE USING TESI. APR. 4, 1972. ARG. 0184314, AUS. 0459354, BEL. 0761030, CAN. 0946912, FRA. 7047635, GRB. 1339714, ITL. 0913996, MEX. 0119467.
4,023,895.—ELECTROSTATOGRAPHIC APPARATUS. MAY 17, 1977.

Class 1B 4B

3,182,591.—IMAGE FORMING APPARATUS AND METHOD. MAY 11, 1965.
3,208,076.—ELECTROSTATIC PRINTER. SEPT. 21, 1965. GRB. 0999260.
3,217,330.—ELECTROSTATIC PRINTING UTILIZING PRINT-THROUGH RECORDING. NOV. 9, 1965. CAN. 0773752, GRB. 1001152.
3,234,359.—RECORD CARD SCANNING APPARATUS. FEB. 8, 1966.
3,234,904.—DEVICE FOR TESIPRINTING. FEB. 15, 1966. AUS. 0277492, CAN. 0804878, FRA. 1367728, GRB. 1024635, ITL. 0697883.
3,257,222.—ELECTROSTATIC RECORDING METHOD AND APPARATUS USING SHAPED ELECTRODES. JUNE 21, 1966. CAN. 0736231, GRB. 1027438, JAP. 0451019.
3,289,209.—ELECTROSTATIC MATRIX PRINTER. NOV. 29, 1966. CAN. 0707049, FRA. 1357858, GER. 1447873, GRB. 1018513, ITL. 0694321, JAP. 0440456.
3,342,126.—MULTIPLE ELECTROGRAPHIC PRINTER HAVING PLURAL UNITS CONNECTED TO COMMON DRIVE MEANS. SEPT. 19, 1967. CAN. 0825341, GRB. 1182685, JAP. 0648073.
3,348,232.—ASYNCHRONOUS PAGE-AT-A-TIME PRINTER. OCT. 17, 1967. CAN. 0709971, GRB. 1025487, JAP. 0462803.
3,358,592.—ELECTROGRAPHIC PRINTING. DEC. 19, 1967. CAN. 0896701, FRA. 1514749, GER. 1512401, GRB. 1182686, ITL. 0793834, MEX. 0098070.
3,430,254.—TESI PRINTING WITH FLEXIBLE ELECTRODE ON ENDLESS BELT. FEB. 25, 1969.
3,438,052.—AIR-SUPPORTED HOUSING CONTAINING TESI PRINTING DRUM. APR. 8, 1969. CAN. 0827330, GRB. 1149349.
3,495,269.—ELECTROGRAPHIC RECORDG METH AND APPRTS W/INERT GASEOUS DISCHARGE IONIZATION AND ACCELERATION GAPS. FEB. 10, 1970. ARG. 0174765, ATR. 0309208, AUS. 0413341, BEL. 0707986, CAN. 0865837, CZC. 0164808, FRA. 1551296, GRB. 1205790, ITL. 0819587, JAP. 0587936, MEX. 0103538, SPN. 0348328, SWD. 0346867, USR. 0291520.
3,599,225.—ELECTROSTATIC RECORDING APPARATUS - AIR GAP APERTURE BELT COMMUNICATIONS PRINTER. AUG. 10, 1971. CAN. 0882319, GRB. 1226436, JAP. 0675796.
3,644,930.—MULTI-STYLUS RECORDER. FEB. 22, 1972. ARG. 0181835, AUS. 0457379, BEL. 0751150, CAN. 0944812, CHL. 0025752, FRA. 7019463, GRB. 1297110, ITL. 0893693, MEX. 0119071, SPN. 0380273, SWD. 0368289, TIW. 0005822, VZL. 0027516.
3,673,600.—ELECTROGRAPHIC RECORDING METHOD AND APPARATUS. JUNE 27, 1972. CAN. 0947361, GRB. 1318605.
3,673,603.—RECIPROCATING CARRIAGE FOR ELECTROGRAPHIC PRINTING. JUNE 27, 1972. CAN. 0937629, GRB. 1346647.
3,686,676.—DUAL MODE ELECTROGRAPHIC RECORDER. AUG. 22, 1972. CAN. 0954293.
3,686,679.—MULTI-STYLUS RECORDING ASSEMBLY. AUG. 22, 1972.
3,714,665.—ELECTROSTATIC RECORDING WITH IMPROVED ELECTROSTATIC CHARGE RETENTION. JAN. 30, 1973.
3,717,880.—DUAL MODE ELECTROGRAPHIC RECORDING. FEB. 20, 1973. BEL. 0774564, CAN. 0948271, FRA. 7139638, GRB. 1366129, ITL. 0937674.
3,766,850.—DEVELOPING MEANS FOR ELECTROSTATIC PRINTING APPARATUS. OCT. 23, 1973. CAN. 0972551, FRA. 7246855, GRB. 1415325, ITL. 0973310, SWD. 7216975.
3,771,184.—PRINTING APPARATUS. NOV. 13, 1973. CAN. 0973704, FRA. 7246858, GRB. 1415200, ITL. 0973321, SWD. 7216973.
3,795,010.—WRITING APPARATUS AND METHOD OF MANUFACTURE. FEB. 26, 1974.
3,806,238.—FORMS OVERLAY TECHNIQUE USING TEST. APR. 23, 1974.
3,811,766.—DEVELOPING APPARATUS. MAY 21, 1974. ARG. 0183333, AUS. 0446187, BEL. 0747127, CAN. 0879412, EGR. 0084803, FRA. 7008249, GRB. 1296417, ITL. 0898245, JAP. 0770134, MEX. 0112930, SPN. 0377301, STZ. 0521614, SWD. 0361749, TIW. 0006826, USR. 0352484.
3,875,578.—ENVELOPED STYLUS RECORDER. APR. 1, 1975. CAN. 0947360, FRA. 7008242, GRB. 1296416.
3,971,042.—WRITING APPARATUS AND METHOD OF MANUFACTURE. JULY 20, 1976.

Class 1C

4,072,522.—METHOD OF TREATING PHOTOCONDUCTIVE ZINC OXIDE. FEB. 7, 1978.

Class 1C 1

3,236,165.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 22, 1966. CAN. 0771829, JAP. 0547196.

3,343,142.—XEROGRAPHIC CODING AND INFORMATION STORAGE ON A SPECULAR BUSINESS MACHINE CARD. SEPT. 19, 1967. CAN. 0844786, GRB. 1047261, JAP. 0701182.

3,437,020.—MICROFILM TITLING APPARATUS. APR. 8, 1969. CAN. 0837780, GRB. 1191019, JAP. 0572188.

3,499,374.—XEROGRAPHIC PRINTER. MAR. 10, 1970. AUS. 0415164, BEL. 0677146, CAN. 0846424, FRA. 1470069, GRB. 1135603, ITL. 0762255, MEX. 0091183, SWD. 0327142.

3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 6872518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.

3,689,143.—REPRODUCING MACHINE. SEPT. 5, 1972.

4,047,810.—DUAL MODE COPYING MACHINE. SEPT. 13, 1977.

Class 1C 2

3,236,165.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 22, 1966. CAN. 0771829, JAP. 0547196.

3,379,106.—XEROGRAPHIC REPRODUCTION APPARATUS. APR. 23, 1968. ATR. 0300567, AUS. 0416116, BEL. 0674602, CAN. 0821718, DNK. 0117045, FRA. 1475712, GRB. 1135742, ITL. 0750206, MEX. 0095580, SPN. 0321099, STZ. 0509924, SWD. 6912065.

3,480,360.—XEROGRAPHIC COPYING APPARATUS. NOV. 25, 1969. ARG. 0180571, ATR. 0301344, AUS. 0310556, BEL. 0704978, CAN. 0870794, CHL. 0023569, FRA. 1540839, GRB. 1206964, GRK. 0035147, HUN. 0158496, IND. 0112715, ITL. 0827017, LXB. 0054635, MEX. 0102269, NZL. 0156632, PRU. 0009341, PTG. 0048460, SAF. 0676065, SPN. 0345998, STZ. 0487439, SWD. 0337743, URG. 0008847, VZL. 0023675.

3,592,539.—RECORDING APPARATUS. JULY 13, 1971. CAN. 0917230.

3,689,143.—REPRODUCING MACHINE. SEPT. 5, 1972.

Class 1C 3

3,130,411.—ELECTRONIC RECORDER. APR. 21, 1964. CAN. 0729326.

3,212,888.—METHOD FOR DEVELOPING LATENT ELECTROSTATIC CHARGE HALFTONE IMAGES. OCT. 19, 1965. GER. 1284302, GRB. 1017683, JAP. 0470423.

3,281,857.—XEROGRAPHIC TRANSFER PLATEN. OCT. 25, 1966. CAN. 0733683, GRB. 1025199.

3,535,036.—APPARATUS FOR FORMING HALF-TONE LINE SCREEN WITH A LENS. OCT. 20, 1970. CAN. 0909309, GRB. 1253887.

3,698,893.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. OCT. 17, 1972.

3,873,310.—METHOD OF CONTROLLING THE BRIGHTNESS ACCEPTANCE RANGE AND TONAL CONTRAST OF XEROGRAPHIC PLATE. MAR. 25, 1975. GRB. 1414951.

3,905,822.—COMPOUND SCREEN FOR OBJECT SCREENING. SEPT. 16, 1975. GRB. 1459558.

3,912,510.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A COMPOUND DOCUMENT SCREEN. OCT. 14, 1975. GRB. 1459558.

4,013,355.—NOTCH FILTER FOR COLOR TRANSPARENCY COPYING MACHINES. MAR. 22, 1977.

4,014,607.—REMOVABLE SCREENING SYSTEM FOR A TRANSPARENCY REPRODUCTION MACHINE. MAR. 29, 1977.

4,025,181.—A SCREEN CLEANING DEVICE. MAY 24, 1977.

4,043,656.—TRANSPARENCY COPYING MACHINE. AUG. 23, 1977.

4,051,536.—ELECTRONIC HALFTONE IMAGING SYSTEM. SEPT. 27, 1977.

4,066,353.—HALF TONE IMAGING SYSTEM. JAN. 3, 1978.

4,068,940.—VARIABLE CONTRAST OPTICAL SCREENING SYSTEM. JAN. 17, 1978.

4,072,414.—SCREEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. FEB. 7, 1978.

4,080,055.—A HALF-TONE COLOR COPIER. MAR. 21, 1978.

4,083,632.—MULTI FREQUENCY SCREEN. APR. 11, 1978.

4,090,786.—MULTI-COLOR SCREEN FOR ELECTROPHOTOGRAPHIC PRINTING. MAY 23, 1978.

4,095,889.—EXPOSURE SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 20, 1978.

4,108,654.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A DOCUMENT SCREEN. AUG. 22, 1978. FRA. 7514227. GRB. 1490898.

4,130,841.—VARIABLE FREQUENCY HALF-TONE IMAGING APPARATUS. DEC. 19, 1978.

4,149,183.—ELECTRONIC HALFTONE GENERATOR. APR. 10, 1979.

4,149,194.—VARIABLE ANGLE ELECTRONC HALFTONE SCREENING. APR. 10, 1979.

4,185,304.—ELECTRONIC HALFTONE SCREENING. JAN. 22, 1980.

4,196,451.—ELECTRONIC HALFTONE GENERATOR. APR. 1, 1980.

4,196,452.—TONER ERROR CONTROL FOR IMAGE CONTOUR REMOVAL. APR. 1, 1980.

4,196,453.—IMAGE SCREENING SYSTEM. APR. 1, 1980.

4,196,454.—TONER ERROR CONTROL FOR RELATIVELY LARGE IMAGE AREAS. APR. 1, 1980.

4,214,277.—HALFTONE IMPLEMENTATION APPARATUS. JULY 22, 1980.

Class 1C 4

3,196,009.—ELECTROSTATIC IMAGE LIQUID DEFORMATION DEVELOPMENT. JULY 20, 1965. ATR. 0267320, AUS. 0273895, BEL. 0631984, CAN. 0768329, DNK. 0129676, FRA. 1408156, GER. 1497058, GRB. 1043981, HOL. 0134043, ISR. 0019144, ITL. 0695213, JAP. 0620918, LXB. 0043704, MEX. 0080571, NOR. 0123260, SAF. 0001947, STZ. 0448745, SWD. 0315502.

3,196,010.—ELECTROPHOTOGRAPHIC PROCESS FOR FORMATION OF DEFORMATION IMAGES IN DEFORMABLE INTERFERENCE FILM. JULY 20, 1965. CAN. 0790232, FRA. 1364100, GRB. 1036738, ITL. 0695214, JAP. 0510166.

3,196,012.—HALF-TONE XEROGRAPHY WITH THERMOPLASTIC DEFORMATION OF THE IMAGE. JULY 20, 1965. CAN. 0760623, FRA. 1359565, GER. 1497060, GRB. 1040836, ITL. 0697483, JAP. 0478444.

3,196,013.—XEROGRAPHIC INDUCTION RECORDING WITH MECHANICALLY DEFORMABLE IMAGE FORMATION IN A DEFORMABLE LAY. JULY 20, 1965. CAN. 0778520, FRA. 1360084, GER. 1253581, ITL. 0711488, JAP. 0649672.

3,307,941.—PLASTIC DEFORMATION IMAGING FILM AND PROCESS. MAR. 7, 1967. CAN. 0801262.

3,419,885.—IMAGE DEVELOPMENT OF THERMOPLASTIC LAYERS. DEC. 31, 1968. CAN. 0785985, GRB. 1117644, JAP. 0537663.

3,436,216.—IMAGE STORAGE COMPRISING A THERMOPLASTIC DEFORMATION PATTERN. APR. 1, 1969. CAN. 0807326, FRA. 1488094, GRB. 1160731, ITL. 0774940.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,698,892.—METHODS OF THERMOPLASTIC XEROGRAPHY AND APPARATUS THEREFOR. OCT. 17, 1972. CAN. 0949117, GRB. 1343191.

3,698,893.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. OCT. 17, 1972.

3,716,359.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. FEB. 13, 1973. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.

3,719,483.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. MAR. 6, 1973.

3,730,621.—CONTROL OF ELECTROSTATIC DEFORMATION OF THERMOPLASTIC FILM. MAY 1, 1973.

3,795,514.—DEFORMATION IMAGING METHOD. MAR. 5, 1974.
3,842,406.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. OCT. 15, 1974. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.
3,858,973.—METHODS OF THERMOPLASTIC XEROGRAPHY AND APPARATUS THEREFOR. JAN. 7, 1975. CAN. 0949117, GRB. 1343191.
3,888,591.—IMAGE SUBTRACTION APPARATUS. JUNE 10, 1975.
3,932,025.—IMAGING SYSTEM. JAN. 13, 1976.
3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.
3,946,433.—PHASE IMAGE SCANNING METHOD. MAR. 23, 1976. BEL. 0835551.
3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.
3,961,950.—IMAGING SYSTEM. JUNE 8, 1976.
3,980,476.—IMAGING SYSTEM. SEPT. 14, 1976.
3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.
3,999,988.—METHOD FOR REAL-TIME COLOR MASKING. DEC. 28, 1976.
4,018,603.—DEFORMATION IMAGING SYSTEM USING THERMOPLASTIC AND ELASTOMERIC LAYERS. APR. 19, 1977.
4,021,236.—IMAGING SYSTEM. MAY 3, 1977.
4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.
4,065,308.—DEFORMATION IMAGING ELEMENT. DEC. 27, 1977.
4,079,421.—IMAGE SCANNING SYSTEM. MAR. 14, 1978.BEL. 835551, SPN. 442965.
4,163,667.—DEFORMABLE IMAGING MEMBER USED IN ELECTRO-OPTIC IMAGING SYSTEMS. AUG. 7, 1979. BEL. 820868, CAN. 1005111, FRA. 7434330, GER 2431770, GRB. 1482703, ITL. 1030694, JAP. 886837.

Class 1C 4A

3,196,008.—ELECTROPC PRCS FOR FRMTN OF FRST LIKE DEFRMTN IMGS IN MECHANICALLY DEFRMBL PHOTOCONDUCTIVE LAYER. JULY 20, 1965. CAN. 0844221.
3,196,011.—ELECTROSTATIC FROSTING. JULY 20, 1965. ARG. 0150575, ATR. 0256625, AUS. 0275848, BEL. 0631983, BRA. 0082433, CAN. 0918226, CHL. 0019655, EIR. 0027268, FIN. 0044982, FRA. 1364101, GER. 1295371, GRB. 1039881, GRK. 0026981, HOL. 0140635, IND. 0087685, ISR. 0019143, ITL. 0695215, LXR. 0043693, MEX. 0102124, NOR. 0118346, NZL. 0134799, PAK. 0114430, PLP. 0003269, PTG. 0040894, SAF. 0001948, SPN. 0292129, STZ. 0425467, SWD. 0315201, TRK. 0011937, UAR. 0004997, VTM. 0000992, VZL. 0014488.
3,213,429.—HIGH SPEED INFORMATION RECORDER. OCT. 19, 1965.
3,258,336.—STRIPPABLE LAYER FROST PRINTING. JUNE 28, 1966. CAN. 0815184.
3,322,034.—FROST COLOR DISPLAY. MAY 30, 1967.
3,329,500.—ELECTROSTATIC FROSTING. JULY 4, 1967.
3,482,969.—FIXING OF DEFORMATION IMAGES. DEC. 9, 1969. CAN. 0801883, FRA. 1399003, GRB. 1061235, ITL. 0726200, SWD. 0315806.
3,485,623.—CONTINUOUS TONE THERMOPLASTIC PHOTOGRAPHY. DEC. 23, 1969. CAN. 0810834, GRB. 1181093, JAP. 0565795.
3,526,879.—INTERNAL FROST RECORDING APPARATUS USING A DEFORMABLE PHOTOCONDUCTOR. SEPT. 1, 1970.
3,542,545.—FROST OR RELIEF WRNKLNG OF AN IMGNG ARTCL COMPRSNG AN ELCTRCLY PHOTSNSTV LAYER AND DEFORMABLE LAY. NOV. 24, 1970. ARG. 0174588, ATR. 0300563, AUS. 0424162, BEL. 0726280, CAN. 0928764, CHL. 0025764, DNK. 0126400, FRA. 1604336, GER. 1817226, GRB. 1234600, GUA. 0002531, ITL. 0864015, JAP. 0693385, LXB. 0057697, MEX. 0107799, NZL. 0154931, PNM. 0001803, PRU. 0010480, SAF. 0688517, SPN. 0362039, STZ. 0518578, SWD. 0354132, URG. 0009690.
3,560,205.—METHOD OF FORMING A PHASE MODULATING HOLOGRAM ON A DEFORMABLE THERMOPLASTIC. FEB. 2, 1971. CAN. 0949793, GRB. 1162853.
3,560,206.—PRODUCTION OF LATENT PERODIC MEMORY PATTERNS IN FROSTABLE FILMS. FEB. 2, 1971.
3,561,958.—INDUCING FROST DEFORMATION IMAGING BY ELECTROLYTIC DEPOSITION. FEB. 9, 1971.
3,672,883.—CRYSTALLINE POLYMERS FOR FROST. JUNE 27, 1972.
3,672,886.—NOVOLAR RESINS IN DEFORMATION IMAGING. JUNE 27, 1972.
3,764,311.—IMAGING SYSTEM. OCT. 9, 1973.
3,819,369.—SURFACE DEFORMABLE IMAGING MEMBER OF IMPROVED DARK DECAY CHARACTERISTICS. JUNE 25, 1974.
3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975. GRB. 1461872.
3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.
4,047,810.—DUAL MODE COPYING MACHINE. SEPT. 13, 1977.

Class 1C 4B

3,238,041.—RELIEF IMAGING OF PHOTORESPONSIVE MEMBER AND PRODUCT. MAR. 1, 1966. CAN. 0850841, GRB. 1043983, MEX. 0080410.
3,321,308.—XEROGRAPHIC INDUCTION RECORDING. MAY 23, 1967. CAN. 0778521, FRA. 1393821, GRB. 1049903, ITL. 0801906, JAP. 0537660.
3,542,545.—FROST OR RELIEF WRNKLNG OF AN IMGNG ARTCL COMPRSNG AN ELCTRCLY PHOTSNSTV LAYER AND DEFORMABLE LAY. NOV. 24, 1970. ARG. 0174588, ATR. 0300563, AUS. 0424162, BEL. 0726280, CAN. 0928764, CHL. 0025764, DNK. 0126400, FRA. 1604336, GER. 1817226, GRB. 1234600, GUA. 0002531, ITL. 0864015, JAP. 0693385, LXB. 0057697, MEX. 0107799, NZL. 0154931, PNM. 0001803, PRU. 0010480, SAF. 0688517, SPN. 0362039, STZ. 0518578, SWD. 0354132, URG. 0009690.
3,615,388.—DEFORMATION IMAGING PROCESS AND ELEMENT. OCT. 26, 1971. CAN. 0941877, MEX. 0101539.
3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975. GRB 1461872.
3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

Class 1C 5

3,519,818.—METHOD OF PREPARING A NEGATIVE XEROGRAPHIC REPRODUCTION FROM A POSITIVE LINE COPY IMAGE. JULY 7, 1970. CAN. 0829037, GRB. 1191159, JAP. 0589516.

Class 1D

3,318,212.—DUPLEX XEROGRAPHIC REPRODUCTION. MAY 9, 1967.
3,506,347.—DUPLEX XEROGRAPHIC REPRODUCTION APPARATUS. APR. 14, 1970.
3,536,398.—REPRODUCTION APPARATUS. OCT. 27, 1970. AUS. 0442047, BEL. 0737274, CAN. 0899443, EGR. 0091200, FRA. 6927759, GRB. 1246226, ITL. 0883645, SPN. 0370416, STZ. 0500517, SWD. 0356144, TIW. 0005358, USR. 0359871.
3,580,670.—APPARATUS FOR DUPLEXING. MAY 25, 1971. CAN. 0929581.
3,615,129.—DUPLEXING XEROGRAPHIC REPRODUCING MACHINE WITH COPY SHEET REVERSING STATION. OCT. 26, 1971. ARG. 0172601, AUS. 0432830, BEL. 0737341, CAN. 0909853, CZC. 0158650, EGR. 0083299, FRA. 6927784, GRB. 1256767, ITL. 0883644, JAP. 0774495, MEX. 0108784, SPN. 0370415, STZ. 0500518, SWD. 0356143, TIW. 0006822, USR. 0371736, VZL. 0032923.
3,671,118.—APPARATUS FOR CREATING DUPLEX REPRODUCTIONS. JUNE 20, 1972. ARG. 0186265, AUS. 0445064, BEL. 0760746, CAN. 0922768, EGR. 0088254, FRA. 7047143, GRB. 1282808, ITL. 0913849, JAP. 0773214, MEX. 0116655, SPN. 0386707, STZ. 0526137, SWD. 0366403.
3,674,475.—ENCLOSED MIGRATION IMAGING SYSTEM. JULY 4, 1972.
3,694,073.—METHOD FOR DUPLEXING. SEPT. 26, 1972.
3,754,822.—SCANNING SYSTEM. AUG. 28, 1973.
3,844,653.—ROOF MIRROR COPYING SYSTEM. OCT. 29, 1974.
3,844,654.—DUPLEX COPYING SYSTEM. OCT. 29, 1974. FRA. 7340246.
3,847,478.—SEGMENTED BIAS ROLL. NOV. 12, 1974.
3,936,171.—ELECTROSTATOGRAPHIC METHODS AND APPARATUS. FEB. 3, 1976.
3,940,210.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. FEB. 24, 1976. BEL. 0832356, IRN. 0013436.
3,944,359.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. MAR. 16, 1976.

4,014,609.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINE. MAR. 29, 1977.
4,035,073.—DUPLEX REPRODUCTION MACHINE. JULY 12, 1977. BEL. 0832115, SPN. 0440012.
4,104,726.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. AUG. 1, 1978.
4,107,779.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. AUG. 15, 1978.
4,109,313.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. AUG. 22, 1978.
4,116,558.—DUPLEX SYSTEM AND METHOD FOR PRECOLLATION COPIERS. SEPT. 26, 1978.
4,120,034.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. OCT. 10, 1978.
4,131,360.—DUPLEX REPRODUCTION SYSTEM EMPLOYING COPY SHEET CLEANER. DEC. 26, 1978.
4,172,655.—SHINGLE SHEET STACKING FOR DUPLEX COPYING. OCT. 30, 1979.

Class 1E

3,227,549.—MULTIPLE IMAGE FORMING XEROGRAPHIC REPRODUCTION PROCESS. JAN. 4, 1966.
3,313,623.—LINE SEQUENTIAL COLOR XEROGRAPHY. APR. 11, 1967. CAN. 0880483, GRB. 1019974.
3,316,805.—COLOR DISPLAY. MAY 2, 1967.
3,357,830.—DYED IMAGE XEROGRAPHY. DEC. 12, 1967. CAN. 0821484, GER. 1277018, GRB. 1016581, ITL. 0679720, JAP. 0477809.
3,373,091.—DATA STORAGE DEVICE AND METHOD. MAR. 12, 1968.
3,386,379.—DUPLICATING WITH COLOR PRODUCING REAGENTS. JUNE 4, 1968. AUS. 0294747, CAN. 0842445, FRA. 1390006, GER. 1249089, GRB. 1043875, ITL. 0801548, JAP. 0611643.
3,468,705.—METHOD OF PREPARING LEAD OXIDE FILMS. SEPT. 23, 1969. CAN. 0806134, FRA. 1501511, GER. 1521942, GRB. 1170428, ITL. 0787638, JAP. 0634868, MEX. 0093335.
3,508,823.—DUPLICATING APPARATUS. APR. 28, 1970.
3,583,806.—DYED IMAGE XEROGRAPHY. JUNE 8, 1971.
3,615,392.—ELECTROPHORETIC REPRODUCTION ORIGINAL CONTAINING BOTH MULTI-COLOR AND LINE AREAS. OCT. 26, 1971.
3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972.
3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. CAN. 0932785.
3,690,756.—COLOR XEROGRAPHY. SEPT. 12, 1972. BEL. 0781001, CAN. 0963522, FRA. 7210584, GRB. 1365753, ITL. 0950399.
3,702,483.—COLOR RENDITION METHOD. NOV. 7, 1972. BEL. 0777015, CAN. 0935334, FRA. 7146255, GRB. 1361647, ITL. 0944210.
3,719,482.—IMAGING SYSTEM. MAR. 6, 1973.
3,724,943.—COLOR REPRODUCTION APPARATUS. APR. 3, 1973. CAN. 0946463.
3,734,607.—COLOR REPRODUCTION APPARATUS. MAY 22, 1973. ARG. 0184654, ATR. 0314352, AUS. 0459724, BEL. 0751490, CAN. 0946462, CHL. 0026265, DNK. 0130156, EGR. 0085001, FRA. 7020455, GRB. 1316499, ITL. 0893863, MEX. 0120285, NZL. 0160302, PNM. 0002259, PTG. 0053890, SAF. 0703775, SPN. 0380376, STZ. 0514164, SWD. 0359176.
3,799,668.—COLOR STANDARD AND METHOD OF CALIBRATING A MULTI-COLOR ELECTROPHOTGRAPHIC PRINTING MACHINE. MAR. 26, 1974. BEL. 0812179, SAF. 0741562.
3,799,774.—MULTI COLOR ELECTROPHOTOGRAPHIC MASKING PROCESS. MAR. 26, 1974.
3,805,283.—CHART CREATION APPARATUS. APR. 16, 1974.
3,869,203.—COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 4, 1975. BEL. 0820041.
3,884,686.—COLOR CORRECTION METHOD. MAY 20, 1975.
3,909,127.—MULTI-COLOR ORIGINAL FOR AN ELECTROPHOTOGRAPHIC PRINTING SYSTEM. SEPT. 30, 1975.
3,914,043.—COLOR ACCENTING COPYING MACHINE. OCT. 21, 1975.
3,936,182.—CONTROL ARRANGEMENT FOR AN ELECTROSTATOGRAPHIC REPRODUCTION APPARATUS. FEB. 3, 1976.
3,944,711.—TRANSPARENCY. MAR. 16, 1976.
3,958,990.—TRANSFERRING TONER TO AN AMINE COATED SHEET. MAY 25, 1976.
3,960,445.—COLOR HIGHLIGHTING ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.
3,963,341.—A COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 15, 1976.
3,970,042.—COLOR DEVELOPMENT APPARATUS. JULY 20, 1976.
3,999,987.—COLOR REPRODUCTION METHOD. DEC. 28, 1976.
4,013,355.—NOTCH FILTER FOR COLOR TRANSPARENCY COPYING MACHINES. MAR. 22, 1977.
4,014,696.—MULTICOLORED XEROGRAPHIC TRANSPARENCY UTILIZING AN APIPHATIC ESTER COATING. MAR. 29, 1977.
4,027,962.—COLOR TRANSPARENCY REPRODUCING MACHINE. JUNE 7, 1977. BEL. 0830321, IRN. 0013435, SPN. 0437814.
4,040,828.—MULTICOLOR IMAGING METHOD AND IMAGED MEMBER EMPLOYING COMBINATION OF TRANSPARENT TONER AND. AUG. 9, 1977. FRA. 7540219.
4,045,218.—METHOD FOR ELECTROSTATICALLY PRODUCING A COLOR ACCENTED PHOTOCOPY. AUG. 30, 1977.
4,045,219.—METHOD OF REPRODUCING COLOR HIGHLIGHTED DOCUMENTS. AUG. 30, 1977.
4,053,216.—COLOR TRANSPARENCY REPRODUCING MACHINE. OCT. 11, 1977. BEL. 830321, FRA. 7518443, GRB. 1489142, IRN. 13435, SPN. 437814, STZ. 597632.
4,053,217.—COLOR TRANSPARENCY REPRODUCING MACHINE. OCT. 11, 1977. BEL. 830321, FRA. 7518443, GRB. 1489142, IRN. 13435, SPN. 437814, STZ. 597632.
4,058,850.—PROGRAMMABLE CONTROLLER. NOV. 15, 1977.
4,063,810.—COLOR TRANSPARENCY REPRODUCING MACHINE. DEC. 20, 1977. BEL. 830321, FRA. 7518443, GRB. 1489142, IRN. 13435, SPN. 437814, STZ. 597632.
4,063,946.—ELECTROPHOTOGRAPHIC COLOR REPRODUCTION PROCESS EMPLOYING PHOTOCONDUCTIVE MATERIAL WITH DUAL. DEC. 20, 1977.
4,068,938.—ELECTROSTAIC COLOR PRINTING USING DISCRETE POTENTIALS. JAN. 17, 1978. GRB. 1442234.
4,068,939.—COLOR TRANSPARENCY REPRODUCING MACHINE. JAN. 17, 1978. BEL. 830321, FRA. 7518443, GRB. 1489142, IRN. 13435, SPN. 437814, STZ. 597632.
4,072,522.—METHOD OF TREATING PHOTOCONDUCTIVE ZINC OXIDE. FEB. 7, 1978.
4,078,929.—METHOD FOR TWO-COLOR DEVELOPMENT OF A XERIOGRAPHIC CHARGE PATTERN. MAR. 14, 1978.
4,082,443.—SYSTEM FOR SUPERPOSITION OF COLOR SEPARATION IMAGES. APR. 4, 1978.
4,087,168.—CHARGING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. MAY 2, 1978.
4,097,139.—REPRODUCING MACHINE HAVING INTERCHANGEABLE DEVELOPER HOUSINGS. JUNE 27, 1978.
4,111,542.—COLLATING SYSTEM FOR OPAQUE DOCUMENTS AND SLIDE REPRODUCTIONS. SEPT. 5, 1978.
4,135,927.—MULTICOLOR XEROGRAPHIC PROCESS. JAN. 23, 1979. ARG. 188730. AUS. 459398. BEL. 767360. CAN. 946910. CHL. 26754. DNK. 133524. FRA. 7118951. GRB. 1345391. ITL. 930586. MEX. 121678. PNM. 2395. SPN. 391274. STZ. 530659. SWD. 358245. TIW. 8520. VZL. 32422.
4,188,110.—PHOTOCONDUCTIVE BELT SUPPORTING APPARATUS. FEB. 12, 1980.

Class 1F

3,109,366.—METHOD FOR PATTERN REPRODUCTION. NOV. 5, 1963. CAN. 0624372.
3,109,367.—METHOD FOR PATTERN REPRODUCTION. NOV. 5, 1963. CAN. 0624374, FRA. 1146623, GER. 1029837, GRB. 0813637.
3,143,066.—PRODUCTION OF DUPLICATING MASTERS. AUG. 4, 1964. CAN. 0722954.
3,428,453.—IMAGE FORMING PROCESS UTILIZING XEROGRAPHY-ETCHING PROCESS. FEB. 18, 1969. CAN. 0856722, FRA. 1428775, GRB. 1085151, ITL. 0754825.
3,455,240.—IMAGING SYSTEM. JULY 15, 1969. CAN. 0823599, GER. 1571913, GRB. 1165676, JAP. 0594700.
3,460,476.—IMAGING PROCESS. AUG. 12, 1969. ARG. 0164839, AUS. 0418783, BEL. 0691755, CAN. 0882050, FRA. 1511173, GRB. 1168268, ITL. 0787662, JAP. 0562388, MEX. 0108240, SPN. 0346128, STZ. 0480672, SWD. 0331794, VZL. 0024009.
3,490,368.—PRINTING BY PARTICULATE IMAGES. JAN. 20, 1970. ARG. 0152222, ATR. 0281875, AUS. 0403243, BEL. 0674293, BRA. 0086720, CAN. 0824922, DNK.

0117303, FIN. 0047145, FRA. 1464987, GER. 1496169, GRB. 1128173, GRK. 0031516, HOL. 0145056, ITL. 0750153, JAP. 0547199, MEX. 0101075, NOR. 0130551, SAF. 0656968, SPN. 0321274, STZ. 0446906, SWD. 0355681, VZL. 0023998.

3,549,447.—IMAGING SYSTEM. DEC. 22, 1970.

3,559,570.—METHOD OF PREPARING AND USING A GRAVURE PRINTING PLATE. FEB. 2, 1971. CAN. 0844544, GRB. 1198142.

3,589,290.—RELIEF IMAGING PLATES MADE BY REPETITIVE XEROGRAPHIC PROCESSES. JUNE 29, 1971. CAN. 0896949.

3,615,128.—APPARATUS FOR ELECTROSTATIC PRINTING. OCT. 26, 1971. CAN. 0910956.

3,638,567.—METHOD OF PREPARING AND UTILIZING A GRAVURE PRINTING MASTER. FEB. 1, 1972.

3,806,354.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES. APR. 23, 1974.

3,884,686.—COLOR CORRECTION METHOD. MAY 20, 1975.

3,919,938.—PERMANENT ELECTROSTATIC MASTER. NOV. 18, 1975.

4,006,267.—COLOR HIGHLIGHTING PROCESS. FEB. 1, 1977.

4,068,588.—PRINTING USING AN ELECTROCHROMIC IMAGE. JAN. 17, 1978.

Class 1G 1

3,124,457.—DIFFERENTIAL IMAGE TRANSFER SYSTEM. MAR. 10, 1964. CAN. 0800184, GRB. 1031986, JAP. 0477375.

3,185,777.—MAGNETIC RECORDING. MAY 25, 1965.

3,485,621.—RECORDING BY PARTICLE ORIENTATION. DEC. 23, 1969. CAN. 0916777, GRB. 1188982, JAP. 0582501.

3,526,191.—DUPLICATING PROCESS EMPLOYING MAGNETIC DEVELOPER MATERIAL. SEPT. 1, 1970. CAN. 0903830, GRB. 1208307.

3,803,638.—RECORDING SYSTEM USING MAGNETIC CORE MATRIX. APR. 9, 1974.

3,875,576.—ELECTROSTATIC IMAGING SYSTEM WITH MAGNETIC TONER. APR. 1, 1975.

4,160,046.—METHOD OF MAKING AN IMAGING SYSTEM. JULY 3, 1979.

Class 1G 2

3,592,642.—DUPL METH PAPR SHT HTS MELTG PT TONR IMG SIMUL CAUSE TRANSF TNR FRPHOTOCNDCR AND FSG TNR IMG ON PAP. JULY 13, 1971. BEL. 0706852, FRA. 1547828, GRB. 1198306, HUN. 0157321, ITL. 0815498.

Class 1G 3

3,275,436.—METHOD OF IMAGE REPRODUCTION UTILIZING A UNIFORM RELEASABLE SURFACE FILM. SEPT. 27, 1966. AUS. 0296158, CAN. 0811877, FRA. 1371894, GRB. 1033523, ITL. 0702168, JAP. 0508402.

3,438,772.—IMG RPDCTN INVLVNG ELCTROSTC TRSF OF RELESBL DONR FILM FRM PTOCNDTV INSLTNG LAYER TO ADHSV TRS. APR. 15, 1969. CAN. 0838044, GRB. 1124954, JAP. 0542587.

3,446,616.—XEROGRAPHIC IMAGING EMPLOYING A SELECTIVELY REMOVABLE LAYER. MAY 27, 1969.

Class 1G 4

3,166,418.—IMAGE DEVELOPMENT. JAN. 19, 1965. CAN. 0747566, FRA. 1259438, GER. 1190334, GRB. 0952609, JAP. 0418117.

3,619,054.—OIL FILM IMAGING APPARATUS. NOV. 9, 1971.

Class 1G 5

3,234,019.—METHOD FOR FORMATION OF AN ELECTROSTATIC IMAGE RESISTANT TO DETERIORATION ON STORAGE. FEB. 8, 1966. ATR. 0248873, AUS. 0266424, BEL. 0618720, FRA. 1325903, GER. 1295374, GRB. 1006231, IND. 0081730, ISR. 0017057, ITL. 0667262, SAF. 0001489, STZ. 0407176, SWD. 0307733.

Class 1G 6

3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.

3,924,945.—APPARATUS FOR INDUCTIVE IMAGING WITH SIMULTANEOUS POLAR INK DEVELOPMENT. DEC. 9, 1975.

3,974,554.—QUANDRANGULAR TRIPETICORD GRAVURE ROLL. AUG. 17, 1976.

3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.

3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. NOV. 30, 1976. GRB. 1429517.

4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11, 1977. GRB. 1429517.

4,017,174.—DEVELOPER ASSEMBLY SUPPORT. APR. 12, 1977.

4,020,788.—DOCTORING MEANS. MAY 3, 1977.

4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. MAY 17, 1977. BEL. 0819537.

4,024,838.—DEVELOPER LIQUID SUPPLY DEVICE. MAY 24, 1977.

Class 1H 1

3,100,427.—PROJECTION DEVICE. AUG. 13, 1963.

3,166,419.—IMAGE PROJECTION. JAN. 19, 1965. CAN. 0699802, FRA. 1260843, GRB. 0955994.

3,166,420.—SIMULTANEOUS IMAGE FORMATION. JAN. 19, 1965. CAN. 0756267, GRB. 0955142.

3,185,050.—XEROGRAPHIC IMAGE PROCESSOR PROJECTOR. MAY 25, 1965.

3,196,765.—IMAGE DEVELOPMENT AND PROJECTION. JULY 27, 1965.

3,220,012.—SIMULTANEOUS RECORDING AND DISPLAY SYSTEM. NOV. 23, 1965. CAN. 0809339, FRA. 1373673, GER. 1303156, GRB. 1019900, ITL. 0695895, JAP. 0470425.

3,317,317.—XEROGRAPHIC METHOD OF MAKING A PARTICLE TRANSPARENCY PROJECTIBLE IMAGE. MAY 2, 1967.

3,320,061.—MASKING BY TOTAL INTERNAL REFLECTION FOR IMAGE REPRODUCTION AND DISPLAY. MAY 16, 1967. CAN. 0847533, FRA. 1401615, GER. 1497081, GRB. 1065986, ITL. 0729029, JAP. 0471308.

3,343,142.—XEROGRAPHIC CODING AND INFORMATION STORAGE ON A SPECULAR BUSINESS MACHINE CARD. SEPT. 19, 1967. CAN. 0844786, GRB. 1047261, JAP. 0701182.

3,519,344.—IMAGE PROJECTION. JULY 7, 1970.

3,543,031.—DEVICE AND PROCESS FOR IMAGE STORAGE. NOV. 24, 1970. ARG. 0161299, AUS. 0432468, BEL. 0703461, CAN. 0862332, FRA. 1543309, GER. 1549142, GRB. 1201374, ITL. 0811521, JAP. 0742514, MEX. 0100142, SPN. 0344004, STZ. 0497022, SWD. 0354169, VZL. 0023663.

3,593,832.—KEYBOARD INPUT DISPLAY DEVICE. JULY 20, 1971.

3,619,049.—XEROGRAPHIC IMAGERY USING A LONG PERSISTENCE PHOSPHOR INTERMEDIATE. NOV. 9, 1971.

3,955,977.—ELECTROSTATOGRAPHIC PROCESS. MAY 11, 1976.

Class 1H 2

3,437,408.—MULTIPLE COPY ELECTROSTATIC IMAGING APPARATUS. APR. 8, 1969. ARG. 0164840, ATR. 0283115, AUS. 0410817, BEL. 0704323, CAN. 0831674, CZC. 0156411, EGR. 0065587, FRA. 1538197, GRB. 1202583, HUN. 0161168, ITL. 0822157, JAP. 0582502, MEX. 0099950, SPN. 0345482, STZ. 0484459, SWD. 0331795, USR. 0353450, VZL. 0023662.

3,512,038.—PIN SYSTEM. MAY 12, 1970. CAN. 0873507, GRB. 1201497, JAP. 0623001.

Class 1I

3,414,409.—PARTICLE TRANSFER. DEC. 3, 1968. BEL. 0713399, CAN. 0822324, FRA. 1568374, GRB. 1145026, ITL. 0829803.

3,543,022.—METH AND APPARATUS CHARG DISCRETE SMALL AREAS XEROGRAPHIC PLATES TO DIF POTENT CONT TONE PRINTG. NOV. 24, 1970. CAN. 0921971, GRB. 1186599.

3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.

3,784,301.—ELECTROPHOTOGRAPHIC METHOD. JAN. 8, 1974.

3,883,349.—ELECTROPHOTOGRAPHIC CHARGING METHOD. MAY 13, 1975.

3,973,846.—ELECTROSTATIC MASTER MAKING APPARATUS. AUG. 10, 1976.

4,021,112.—PHOTORECEPTOR DARK CURRENT LEAKAGE DETECTING APP FOP XEROGRAPHIC MACHINES. May 3, 1977.
4,039,831.—TWO COLOR XERORADIOGRAPHY DEVELOPMENT. AUG. 2, 1977.
4,134,137.—SINGLE WIRE MICROELECTROMETER IMAGING SYSTEM. JAN. 9, 1979.

Class 1J

3,652,156.—LINEAR-TO-DRUM OPTICAL SCAN CONVERTER SYSTEM. MAR. 28, 1972.
3,766,850.—DEVELOPING MEANS FOR ELECTROSTATIC PRINTING APPARATUS. OCT. 23, 1973. CAN. 0972551, FRA. 7246855, GRB. 1415325, ITL. 0973310, SWC. 7216975.
3,954,463.—METHOD FOR ELECTROSTATIC PRINTING. MAY 4, 1976.
4,046,472.—ELECTROSTATIC IMAGING APPARATUS. SEPT. 6, 1977.
4,103,995.—IMAGING APPARATUS. AUG. 1, 1978.
4,174,903.—COMBINED PROCESSING STATION FOR USE IN AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. NOV. 20, 1979.

Class 1J 1

3,099,943.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 6, 1963. ADN. 0000468, ARG. 0169828, ATR. 0251420, AUS. 0270773, BEL. 0629050, BRA. 0082981, BRS. 00J3736, BRU. 0000369, CAN. 0738132, CHL. 0023724, CLB. 0015207, COS. 0001436, ECD. 0000022, FIJ. 0000340, FRA. 1346575, GHA. 0000997, GIB. 1032951, GIE. 0006569, GRB. 1032951, GRK. 0025939, GUA. 0001740, GUR. 1032951, HGK. 0008969, IND. 0086614, ISR. 0018757, ITL. 0752146, JAP. 0491155, JER. 0000P97, KEN. 0001743, LXB. 0043231, MAU. 1897571, MEX. 0074814, MLS. 0014969, NIG. 0001617, NOR. 0124476, NZL. 0134238, PRU. 0008375, PTG. 0040583, SAF. 0063737, SBH. 0005169, SGP. 0008069, SHL. 0000016, SLN. 1677286, SPN. 0286059, SRK. 0000387, STZ. 0425469, SWD. 0323285, UGD. 0000169, URG. 0007713, VZL. 0017049.
3,131,617.—XEROGRAPHIC REPRODUCING APPARATUS. MAY 5, 1964.
3,135,179.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.
3,135,180.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.
3,139,013.—DOCUMENT REPRODUCING APPARATUS. JUNE 30, 1964. CAN. 0727819, FRA. 1346596, GRB. 1016265, JAP. 0442652.
3,146,688.—XEROGRAPHIC MACHINE. SEPT. 1, 1964. ATR. 0249503, AUS. 0272158, BEL. 0616948, CAN. 0712269, FRA. 1324504, GER. 1295372, GRB. 1009867, JAP. 0464921.
3,182,573.—MASKED PLATE XEROGRAPHY. MAY 11, 1965. CAN. 0859657, FRA. 1353685, GRB. 1021882, ITL. 0694073, JAP. 0470242.
3,205,484.—ELECTROSTATIC MEMORY SYSTEM. SEPT. 7, 1965.
3,355,983.—CARD HANDLING MECHANISM. DEC. 5, 1967. CAN. 0814086, MEX. 0113373.
3,514,201.—RECORDING APPARATUS. MAY 26, 1970. CAN. 0880484.
3,520,602.—GRAPHIC DISPLAY DEVICE. JULY 14, 1970. CAN. 0838312.
3,536,395.—TRANSACTION RECORDING APPARATUS AND SYSTEM. OCT. 27, 1970. CAN. 0870184, GRB. 1213825.
3,580,671.—EXPOSURE APPARATUS. MAY 25, 1971. CAN. 0912104, GRB. 1276010.
3,677,633.—PORTABLE DOCUMENT ABSTRACTOR. JULY 18, 1972.
3,770,430.—PHOTOELECTROSCLOGRAPHIC IMAGING PROCESS. NOV. 6, 1973.
3,865,482.—ELECTROSTATOGRAPHIC COPYING MACHINE. FEB. 11, 1975.
3,917,396.—CONTROL SYSTEM. NOV. 4, 1975.
3,955,977.—ELECTROSTATOGRAPHIC PROCESS. MAY 11, 1976.
3,976,374.—ELIMINATION OF REDUNDANT IMAGE. AUG. 24, 1976. GRB. 1419725.
3,977,780.—ELECTROSTATIC REPRODUCTION METHOD AND APPARATUS. AUG. 31, 1976.
RE29,514.—PROGRAMMING CONTROL SYSTEM FOR PRINTING MACHINE. JAN. 10, 1978.
4,046,472.—ELECTROSTATIC IMAGING APPARATUS. SEPT. 6, 1977.
4,054,380.—CONTROL SYSTEM FOR HIGH SPEED COPIER/DUPLICATORS. OCT. 18, 1977. GRB. 1491911.
4,093,367.—IMAGING APPARATUS. JUNE 6, 1978.
4,103,995.—IMAGING APPARATUS. AUG. 1, 1978.
4,122,996.—COPY REPRODUCTION MACHINE WITH CONTROLLER SELF CHECK SYSTEM. OCT. 31, 1978.
4,124,287.—IMAGING SYSTEM UTILIZING UNCHARGED MARKING PARTICLES. NOV. 7, 1978.
4,125,325.—AUTOMATIC DUPLEX CONTROL SYSTEM FOR A REPRODUCTION MACHINE. NOV. 14, 1978. BEL. 870043.
4,130,354.—REPRODUCTION MACHINE HAVING DUPLEX JOB RECOVERY CAPABILITIES. DEC. 19, 1978. BEL. 870038.
4,149,487.—XEROGRAPHIC MACHINE WITH INFINITELY VARIABLE DEVELOPER BIAS. APR. 17, 1979.
4,153,241.—DOUBLE DOCUMENT FEED DETECTION FOR A DOCUMENT HANDLER IN A REPRODUCTION MACHINE. MAY 8, 1979. BEL. 870041.
4,156,133.—REPRODUCTION MACHINE WITH PAPER PATH DETECTION DIAGNOSTICS. MAY 22, 1979. BEL. 870040.
4,158,886.—OPERATOR CONSOLE FOR A REPRODUCTION MACHINE. JUNE 19, 1979. BEL. 870041.
4,161,277.—IMPROPER COPY RUN PROGRAM ENTRY CHECK FOR ELECTROSTATIC TYPE REPRODUCTION OR COPYING MACHINE. JULY 17, 1979.
4,162,844.—REPRODUCTION MACHINE WITH DUPLEX IMAGE SHIFT. JULY 31, 1979. BEL. 870037.
4,165,170.—CONTROL SYSTEM. AUG. 21, 1979.
4,181,429.—SAMPLE COPY SYSTEM FOR XEROGRAPHIC REPRODUCTION MACHINE. JAN. 1, 1980.
4,186,299.—REPRODUCTION MACHINE WITH DIFFERENT OPERATING PROGRAMS. JAN. 29, 1980. BEL. 870041.
4,196,476.—REPRODUCTION MACHINE WITH SELECTIVELY DISCLOSABLE PROGRAMS. APR. 1, 1980. BEL. 870039.
4,198,680.—CONTROL SYSTEM FOR ELECTROSTATIC TYPE COPY REPRODUCING MACHINES. APR. 15, 1980.
4,204,670.—SORTER FOR A REPRODUCTION MACHINE. MAY 27, 1980. BEL. 870044.
4,206,995.—REPRODUCTION MACHINE WITH ON BOARD DOCUMENT HANDLER DIAGNOSTICS. JUNE 10, 1980. BEL. 870041.

Class 1J 1A

4,183,089.—DATA COMMUNICATIONS SYSTEM. JAN. 8, 1980.
4,190,350.—DISTRIBUTED MICROPROCESSOR CONTROL SYSTEM FOR A COPIER/DUPLICATOR. FEB. 26, 1980.

Class 1J 2

3,185,051.—XEROGRAPHIC METHOD. MAY 25, 1965. CAN. 0740113, FRA. 1385444, GRB. 1026557, ITL. 0712017.
3,237,197.—IMAGE METHOD FOR ELECTROSTATIC RETENTION IN PHOTOCONDUCTIVE LAYERS. FEB. 22, 1966.

Class 1J 3

3,105,426.—XEROGRAPHIC APPARATUS. OCT. 1, 1963. CAN. 0689214, FRA. 1290414, GER. 1297476, GRB. 0989487, JAP. 0626117.
3,132,206.—HIGH SPEED PRINTING APPARATUS. MAY 5, 1964. GRB. 0990043.
3,649,114.—MULTIPLE OUTPUT ELECTROSTATIC RECORDING SYSTEM. MAR. 14, 1972. ARG. 0200567, AUS. 0447901, CAN. 0923542, NZL. 0160104.

Class 1J 4

3,148,601.—XEROGRAPHIC REPRODUCING APPARATUS. SEPT. 15, 1964.
3,187,651.—XEROGRAPHIC REPRODUCING APPARATUS. JUNE 8, 1965. FRA. 1338861, GER. 1797533, GRB. 1015633, HGK. 0013368, JAP. 0441423, KEN. 0167368.
3,196,767.—DOCUMENT COPY MECHANISM. JULY 27, 1965. CAN. 0731929, GRB. 1032953, JAP. 0651995.
3,399,610.—XEROGRAPHIC APPARATUS. SEPT. 3, 1968. CAN. 0819923.
3,788,203.—JUSTIFICATION APPARATUS. JAN. 29, 1974. CAN. 0989929, GRB. 1380831.
3,982,831.—ELECTROSTATOGRAPHIC REPRODUCTION APP & DRIVE THEREFOR. SEPT. 28, 1976.
4,002,409.—CHAIN-FEED CONTROL LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. JAN. 11, 1977. BEL. 0840300.
4,027,963.—MULTI-MODE REPRODUCING APPARATUS. JUNE 7, 1977. BEL. 0843154, HAT. 0001534.

4,053,221.—MULTI-MODE REPRODUCING APPARATUS. OCT. 11, 1977.

Class 1J 5

3,160,057.—XEROGRAPHIC PROCESSING APPARATUS. DEC. 8, 1964.
3,272,101.—XEROGRAPHIC APPARATUS. SEPT. 13, 1966.
3,520,605.—DOCUMENT SCAN DRIVE AND RETURN APPARATUS. JULY 14, 1970. CAN. 0858848.
3,697,160.—CONTINUOUS IMAGING APPARATUS. OCT. 10, 1972.

Class 1J 6

RE.27,776.—ROLLER ASSEMBLY FR BELT-TYPE PHOTORECEPTR IN ELECTROSTATC PRNTNG MACHINES—RE OF D1480—3,536. OCT. 9, 1973.
3,190,199.—XEROGRAPHIC COPYING APPARATUS. JUNE 22, 1965. CAN. 0709970, GRB. 1033834, JAP. 0477813.
3,435,693.—BELT TRACKING DEVICE. APR. 1, 1969. ARG. 0168295, ATR. 0283116, AUS. 0421893, BEL. 0705641, CAN. 0853440, CHL. 0023084, CLB. 0017528, DNK. 0117047, FRA. 1543079, GRB. 1180659, ITL. 0827782, MEX. 0100320, NOR. 0124530, PRU. 0009336, SAF. 0676414, SPN. 0346430, STZ. 0471736, URG. 0009729, VZL. 0023676.
3,536,323.—BELT ASSEMBLY—REISSUED D3492—27,776. OCT. 27, 1970. ARG. 0181307, AUS. 0437364, BEL. 0733405, BRA. 6909127, CAN. 0943179, FRA. 6917082, GRB. 1275135, HUN. 0157763, ITL. 0869475, JAP. 0700616, MEX. 0112302, PNM. 0001817, SPN. 0367615, STZ. 0506819, TIW. 0UM5646, USR. 0406385, VZL. 0025831.
3,661,452.—XEROGRAPHIC REPRODUCTION MACHINE. MAY 9, 1972. ARG. 0169621, AUS. 0442749, BEL. 0733407, CAN. 0910959, CHL. 0024800, DNK. 0125257, FRA. 6917084, GRB. 1264406, ITL. 0877771, MEX. 0115542, PNM. 0001759, PRU. 0010640, SPN. 0367613, STZ. 0491418, TIW. 0006498, USR. 0358875, VZL. 0026279.
3,664,204.—BELT ASSEMBLY FOR USE IN AN ELECTROSTATIC PRINTING MACHINE. MAY 23, 1972. ARG. 0193980, BEL. 0777322, CAN. 0939735, FRA. 7147893, GRB. 1372389, ITL. 0944437, MEX. 0128274, VZL. 0032791.
3,730,623.—VACUUM HOLDDOWN DEVICE FOR MOVING BELTS. MAY 1, 1973. ARG. 0191239, BEL. 0777323, CAN. 0940591, FRA. 7147894, GRB. 1372390, ITL. 0944436, MEX. 0127634.
3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,790,271.—PROCESSING CONTROL SYSTEM FOR PRINTING MACHINES. FEB. 5, 1974. CAN. 0986173, SPN. 0418256.
3,801,092.—VACUUM HOLD-DOWN DEVICE FOR MOVING BELTS. APR. 2, 1974. ARG. 0191239, BEL. 0777323, CAN. 0940591, FRA. 7147894, GRB. 1372390, ITL. 0944436, MEX. 0127634.
3,860,340.—OPTICAL ALIGNMENT ON VACUUM PLENUM. JAN. 14, 1975. BEL. 0784630, FRA. 7220686, GRB. 1379674, ITL. 0956164.
3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.
3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.
3,921,179.—FLUID PEN ASSEMBLY. NOV. 18, 1975.
3,961,849.—ELECTROSTATIC PRINTING MACHINE. JUNE 8, 1976. ARG. 0200108, ATR. 0323556, AUS. 0458405, BEL. 0776599, CAN. 0948274, FRA. 7145342, GRB. 1374799, ITL. 0943875, MEX. 0127493, PNM. 0718307, SAF. 0718307, SPN. 0397851, STZ. 0554009, SWD. 7115731, VZL. 0032936.
4,094,606.—XEROGRAPHIC SYSTEM EMPLOYING WAVEGUIDE ADDRESSING AND MODULATING APPARATUS. JUNE 13, 1978.

Class 1J 7

3,099,944.—XEROGRAPHIC CONTROL APPARATUS. AUG. 6, 1963. CAN. 0738131, IND. 0096308, JAP. 0491992.
3,512,885.—ACCOUNTING DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. MAY 19, 1970. ARG. 0152214, ATR. 0285324, AUS. 0409894, BEL. 0670170, BRA. 0086686, CAN. 0763624, CHL. 0022095, CLB. 0015661, COS. 0001881, DNK. 0125559, ECD. 0000019, EGR. 0050203, EIR. 0029756, ELS. 0000939, FRA. 1459931, GER. 1522804, GRB. 1122622, GRK. 0030861, GUA. 0001741, HOL. 0146300, IND. 0096570, ISR. 0024363, ITL. 0729658, JAP. 0513607, LXB. 0049537, MEX. 0079047, NOR. 0124392, NZL. 0142991, PAK. 0116058 PLP. 0005074, PNM. 0002079, PRU. 0008106, PTG. 0044651, SAF. 0655276, SPN. 0318011, STZ. 0438031, SWD. 0358037, TRK. 0013473, UAR. 0007497, URG. 0006622, VZL. 0023997.
3,588,472.—LOGIC CONTROL APPARATUS. JUNE 28, 1971. ARG. 0181590. ATR. 0279353, BEL. 0706629, BRA. 6793350, CAN. 0834957, FRA. 1567082, GRB. 1204719, ITL. 0815466, JAP. 0645591, LXB. 0054882, MEX. 0101675, VZL. 0023684.
3,734,610.—MICROFICHE VIEWER-COPIER WITH BILLING DATA STORAGE. MAY 22, 1973.
3,813,157.—CONTROL LOGIC FOR TROUBLE DETECTION AND RECOVERY. MAY 28, 1974.

Class 1J 8

3,301,152.—XEROGRAPHIC COPYING APPARATUS. JAN. 31, 1967.
3,348,521.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799398.
3,453,045.—XEROGRAPHIC DEVELOPMENT APPARATUS. JULY 1, 1969. CAN. 0852125, FRA. 1559973, GRB. 1213493, HUN. 0156188, ITL. 0832847, JAP. 0602169, USR. 0371739.
3,542,466.—DEVELOPMENT APPARATUS. NOV. 24, 1970. AUS. 0428620, BEL. 0725611, CAN. 0884213, FRA. 1598505, GRB. 1203167, ITL. 0870661, JAP. 0641479, SPN. 0361653, SWD. 0343694.
3,695,224.—CASCADE DEVELOPMENT. OCT. 3, 1972.
3,816,756.—AUTOMATIC BIAS CONTROL. JUNE 11, 1974.
3,851,966.—REPRODUCTION APPARATUS. DEC. 3, 1974. BEL. 808482.
3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. GRB. 1429517.
4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11,, 1977. GRB. 1429517.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. BEL. 0819537, GRB. 1429518.

Class 1K

T.940,022.—PRESSURIZED AND FILTERED XEROGRAPHIC SYSTEM. NOV. 4, 1975.
3,638,110.—DEVC FOR MEASRNG CHRG ON MATRIAL BY CONVRTNG INTO ELCTRCL SGNLS FRICTNL FORCS CAUSD BY CHARGE. JAN. 25, 1972. AUS. 0161306, BEL. 0746479, FRA. 7007991, GRB. 1280803, HUN. 0161306, ITL. 0892329, JAP. 0681943, PLD. 0069581, SPN. 0376910, STZ. 0519185, SWD. 0364418, USR. 0412696.
3,661,453.—ELECTROSTATIC LABEL PRINTER. MAY 9, 1972. CAN. 0927471, FRA. 7122950, GRB. 1345800, ITL. 0927543.
3,893,175.—RECORDER FOR MONITORING COPIERS. JULY 1, 1975. GRB. 1427292.
4,007,326.—ELECTRONIC COPY ANALYSIS. FEB. 8, 1977.
4,016,310.—COATR HRDWR & METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.
4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.
4,023,901.—REPRODUCTION MACHINE SERVICE CONTROL. MAY 17, 1977.
4,025,188.—PHOTOACTIVE DEVICE FOR XEROGRAPHY. MAY 24, 1977.
4,026,397.—CONTROL KNOB CLUTCHES WITH LOCK. MAY 31, 1977.
4,134,137.—SINGLE WIRE MICROELECTROMETER IMAGING SYSTEM. JAN. 9, 1979.

Class 1K 1

3,835,380.—ELECTROMETER SYSTEM. SEPT. 10, 1974.
3,852,668.—ELECTROMETER SYSTEM. DEC. 3, 1974.
3,887,845.—COPIER PHOTORECEPTOR CHARGE CONTROL. JUNE 3, 1975. GRB. 1465969.

3,891,316.—MULTI-PROCESS CONTROL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 24, 1975.
3,898,001.—ELCTROMETR SYSTM FOR NON-CNTCT DETCTN OF ELCTRSTATC CHRGE ON A MVNG ELCTRSTGRPHC IMAGNG SURFACE. AUG. 5, 1975.
3,909,126.—MULTI-PROCESS CONTROL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 30, 1975.
3,934,141.—APPARATUS FOR AUTOMATICALLY REGULATING THE AMOUNT OF CHARGE APPLIED TO AN INSULATING SURFACE. JAN. 20, 1976.
3,935,531.—ELECTROMETER WITH LOW VOLTAGE INDICATOR. JAN. 27, 1976.
3,935,532.—AUTOMATIC ZEROING ELECTROMETER. JAN. 27, 1976.
3,998,538.—ELECTROMETER APPARATUS FOR REPRODUCTION MACHINES. DEC. 21, 1976.
4,000,944.—PHOTORECEPTOR FOR ELECTROSTATIC REPRODUCTION MACHINES WITH BUILT IN ELECTRODE. JAN. 4, 1977.
4,003,650.—CONTROLLER FOR REPRODUCTION APPARATUS. JAN. 18, 1977.
4,100,484.—D.C. ELECTROMETER. JULY 11, 1978.
4,105,321.—ILLUMINATED CHARGE CONTROL SYSTEM FOR XEROGRAPHIC MACHINES. AUG. 8, 1978.
4,127,806.—SHIELDED ELECTROMETER WHOSE OUTPUT IS USED TO CONTROL WIDTH OF PULSES FED BACK TO THE SHIELD. NOV. 28, 1978.
4,139,813.—ADAPTOR FOR AN ELECTROMETER PROBE TO PERMIT CONTACT POTENTIAL MEASUREMENTS AND METHOD FOR USE. FEB. 13, 1979.
4,149,119.—COMBINED AC-DC ELECTROMETER WITH AC FEEDBACK FOR DRIFT COMPENSATION. APR. 10, 1979.

Class 1K 2

3,335,003.—REFLEX XEROGRAPHIC PROCESS. AUG. 8, 1967. CAN. 0764912, FRA. 1415836, GER. 1261398, GRB. 1059657, ITL. 0741353, JAP. 0511404.
3,337,339.—SCREEN XEROGRAPHY. AUG. 22, 1967. AUS. 0291558, BEL. 0638029, CAN. 0729824, DNK. 0114045, FRA. 1404424, GER. 0114045, GRB. 1027354, HOL. 0130250, ITL. 0706191, JAP. 0489562, LXB. 0044538, NOR. 0109228, SWD. 0321859.
3,676,118.—REFLEX XEROGRAPHY IMAGING SYSTEM. JULY 11, 1972.
4,063,154.—D.C. ELECTROMETER. DEC. 13, 1977.
4,063,155.—D.C. ELECTROMETER PROBE. DEC. 13, 1977.
4,106,869.—DISTANCE COMPENSATED ELECTROSTATIC VOLTMETER. AUG. 15, 1978.

Class 1K 3

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

Class 2

4,043,549.—IMPACT FEEDER AUG. 23, 1977.
4,059,353.—PHOTORECEPTOR BELT SYSTEM. NOV. 22, 1977.
4,192,989.—BLANKET HEATED PHOTORECEPTOR. MAR. 11, 1980.

Class 2A

3,856,461.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974.
3,856,462.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974. BEL. 0821050.
3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLF AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436.
3,883,921.—CLEANING ROLL APPARATUS HAVING REJUVENATED CLEANING SURFACE. MAY 20, 1975.
3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.
3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.
3,984,183.—SHEET STRIPPING FROM IMAGING SURFACE. OCT. 5, 1976. BEL. 0836791.
3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.
4,004,549.—ROLL FUSER. JAN. 25, 1977.
4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.
4,027,138.—A FUSER RELEASE MATERIAL DISPENSER. MAY 31, 1977.
4,035,140.—FIXING DEVICE IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 12, 1977.
4,045,163.—HEATED FUSER RELEASE AGENT CONTAINER. AUG. 30, 1977.
4,060,105.—TONER LOADING APPARATUS WITH REPLENISHING SUPPLY CONTAINER. NOV. 29, 1977.
4,063,530.—IMAGE FIXING. DEC. 20, 1977.
4,072,522.—METHOD OF TREATING PHOTOCONDUCTIVE ZINC OXIDE. FEB. 7, 1978.
4,078,924.—IMAGING SURFACE SMOOTHING WITH ROUGHENED FOIL NICKEL. MAR. 14, 1978.
4,172,721.—DYE-AMPLIFIED IMAGING PROCESS. OCT. 30, 1979. AUS. 494739, BEL. 822400, CAN. 1033041, FRA. 7438506, GER. 7438730, GRB. 1484706, ITL. 1025877, SPN. 432205, SWD. 74144650.

Class 2A 1

3,764,315.—AMBIPOLAR ELECTROPHOTOGRAPHIC PLATE. OCT. 9, 1973. BEL. 0802608, GRB. 1421948.
3,948,656.—IMPROVED METHOD FOR THE PREPARATION OF CDSSE. APR. 6, 1976.

Class 2A 1A

3,170,790.—RED SENSITIVE XEROGRAPHIC PLATE AND PROCESS THEREFOR. FEB. 23, 1965.
3,174,855.—METHOD FOR A PRODUCTION OF A XEROGRAPHIC PLATE. MAR. 23, 1965.
3,234,020.—PLATE FOR ELECTROSTATIC ELECTROPHOTOGRAPHY. FEB. 8, 1966.
3,460,296.—METAL WORKING. AUG. 12, 1969. BEL. 0705574, CAN. 0853918, GRB. 1196684.
3,488,896.—PROCESS OF PUMICING A SURFACE. JAN. 13, 1970.
3,489,560.—PHOTOCONDUCTIVE LAYR COMPRISN SELENIUM COMPOUND AND SOLID HYDROPHOBIC METL SALT OF A FATTY ACID. JAN. 13, 1970. BEL. 0711297, CAN. 0871632, FRA. 1544448, GRB. 1203237.
3,517,995.—METHOD & APPARATUS FOR INCREASING THE EFFICIENCY OF CORONA CHARGNG. JUNE 30, 1970. ARG. 0172471, BEL. 0721553, CAN. 0856714, FRA. 1585283, GRB. 1247034, ITL. 0844214, JAP. 0708414, MEX. 0103113, VZL. 0023701.
3,552,848.—XEROGRAPHIC PLATE. JAN. 5, 1971.
3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.
3,954,464.—METHOD OF FABRICATING A COMPOSITE TRIGONAL SELENIUM PHOTORECEPTOR. MAY 4, 1976.
3,961,953.—METHOD OF FABRICATING COMPOSITES TRIGONAL SELENIUM PHOTORECEPTORS. JUNE 8, 1976.
4,007,255.—PREPARATION OF RED AMORPHOUS SELENIUM. FEB. 8, 1977.
4,009,249.—PREPARATION OF RED AMORPHOUS SELENIUM. FEB. 22, 1977.
4,019,014.—METHOD FOR HEAT WELDING SELENIUM. APR. 19, 1977.

Class 2A 1B

3,312,548.—XEROGRAPHIC PLATES. APR. 4, 1967. BEL. 0691217, CAN. 0819658, FRA. 1505803, GRB. 1165579, JAP. 0650232.
3,467,548.—METHOD OF MAKING XEROGRAPHIC PLATE BY VACUUM EVAPORATION OF SELENIUM ALLOY. SEPT. 16, 1969.
3,490,903.—ALLOYS OF ANTIMONY AND SELENIUM USED IN PHOTOCONDUCTIVE ELEMENTS. JAN. 20, 1970. AUS. 0412949, CAN. 0871074, FRA. 1533536, GRB. 1185389, ITL. 0805955, JAP. 0626127, SWD. 0318193.
3,511,649.—PROCESS OF REDUCING FATIGUE IN PHOTOCONDUCTIVE GLASSES. MAY 12, 1970. GRB. 1193472, JAP. 0604152.
3,524,745.—PHOTOCONDUCTIVE ALLOY OF ARSENIC ANTIMONY AND SELENIUM. AUG. 18, 1970. ARG. 0164055, AUS. 0410443, BEL. 0709132, CAN. 0884810, CHL. 0024255, FRA. 1550902, GRB. 1209971, IND. 0113988, ITL. 0833508, JAP. 9124370, LXB. 0055231, MEX. 0108993, NOR. 0127943, NZL. 0151243, PRU. 0009904, PTG. 0048919, SAF. 0680228, SPN. 0349235, STZ. 0495573, SWD. 0328189, URG. 0009683.
3,615,413.—INDIUM DOPING OF A SE-AS PHOTOCONDUCTIVE ALLOYS. OCT. 26, 1971. CAN. 0917981, GRB. 1309312, JAP. 0739528.
3,655,377.—TRI-LAYERED SELENIUM DOPED PHOTORECEPTOR. APR. 11, 1972.
3,660,086.—ELCTRPHTGRPC PLATE AND PROCS EMPLYNG INORGNC PHOTCNDCTV MATRL W/PHOTOCHROMIC SENSITIVE AGENT. MAY 2, 1972.

3,685,989.—AMBIPOLAR PHOTORECEPTOR AND METHOD OF IMAGING. AUG. 22, 1972. CAN. 0971800, GRB. 1360078.

3,697,265.—VTRS SELNUM ALLY MTRX CNTNING ISLTD PRTCLS/PRTCL NETWKS OF RSN. OCT. 10, 1972. ARG. 0183560, ATR. 0299699, AUS. 0449439, BEL. 0752439, CAN. 0933014, EGR. 0090944, FRA. 7023472, GRB. 1319341, ITL. 0894623, MEX. 0116409, PNM. 0002539, SPN. 0409740, STZ. 0000000, SWD. 7216008, TIW. 0006838, USR. 0374867, VZL. 0031909.

3,879,199.—SURFACE TREATMENT OF ARSENIC-SELENIUM PHOTOCONDUCTORS. APR. 22, 1975.

3,884,688.—PHOTOSENSITIVE ELEMENT EMPLOYING A VITREOUS BISMUTH-SELENIUM FILM. MAY 20, 1975.

3,887,368.—COMPOSITION. JUNE 3, 1975.

3,898,083.—HIGH SENSITIVITY VISIBLE INFRARED PHOTOCONDUCTOR. AUG. 5, 1975.

3,909,458.—PHOTOSENSITIVE VITREOUS LAYER COMPRISING BISMUTH AND SELENIUM. SEPT. 30, 1975.

4,015,029.—SELENIUM & SELENIUM ALLOY EVAPORATION TECHNIQUE. MAR. 29, 1977.

4,126,457.—EVAPORATION TECHNIQUE FOR PRODUCING TEMPERATURE PHOTORECEPTOR ALLOYS. NOV. 21, 1978. CAN. 1046864.

Class 2A 1C

3,140,174.—PROCESS FOR OVERCOATING A XEROGRAPHIC PLATE. JULY. 7, 1964. FRA. 1260498, GRB. 0960871.

3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.

3,682,631.—METHOD OF FORMING AN ELECTROPHOTOGRAPHIC LAYER CONTAINING A BENZOQUANAMINE RESIN BINDER. AUG. 8, 1972.

3,867,145.—METHANOL AND HEAT TREATED ZINC OXIDE. FEB. 18, 1975.

3,971,742.—ORGANO-CHALCOGEN COMPOSITIONS. JULY 27, 1976.

Class 2A 1D

3,469,978.—PHOTOSENSITIVE ELEMENT. SEPT. 30, 1969. CAN. 0872173, GRB. 1171909, JAP. 0552967.

3,522,040.—PHOTOSENSITIVE INSULATING MATERIAL. JULY 28, 1970. CAN. 0884808, GRB. 1171910, JAP. 0552966.

3,627,573.—COMPOSITION AND METHOD. DEC. 14, 1971. ARG. 0176480, AUS. 0441224, BEL. 0721965. CAN. 0892493, FRA. 0095985, GRB. 1251630, ITL. 0889828, MEX. 0124897, SPN. 0358960, STZ. 0517359, VZL. 0030358.

Class 2A 1E

3,238,150.—PHOTOCONDUCTIVE CADMIUM SULFIDE POWDER AND METHOD FOR THE PREPARATION THEREOF. MAR. 1, 1966. CAN. 0712516, GRB. 1062022, JAP. 0486530.

3,879,200.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING BIX-BENZIMIDAZOLE PIGMENTS. APR. 22, 1975. ARG. 0188392, AUS. 0465970, BEL. 0763545, BRA. 0088118, CAN. 0928125, CHL. 0027130, EGR. 0093279, FRA. 7107565, GRB. 1337222, ITL. 0919105, MEX. 0122169, PNM. 0002460, SAF. 0711225, SPN. 0388590, TIW. 0008178, USR. 0449515.

3,909,261.—XEROGRAPHIC IMAGING MEMBER HAVING PHOTOCONDUCTIVE MATERIAL IN INTERLOCKING CONTINUOUS PATHS. SEPT. 30, 1975. ARG. 0186443, ATR. 0451252, BEL. 0763544, CAN. 0925741, CHL. 0026794, FRA. 7107567, GRB. 1296291, ITL. 0918909, MEX. 0122096, NZL. 0162891, PLP. 0009378, PNM. 0002396, SAF. 0711227, SPN. 0388639, STZ. 0568591, SWD. 0367259, TIW. 0007844, USR. 0398062.

Class 2A 1F

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL CONTAINING ELECTRON-DONOR DYE LAYERS. JULY 23, 1968. GRB. 1106562.

3,498,835.—METHOD FOR MAKING XEROGRAPHIC PLATES. MAR. 3, 1970. ARG. 0154134, AUS. 0418468, BEL. 0700454, CAN. 0872174, FRA. 1529285, GRB. 1189504, ITL. 0807717, JAP. 0567234, MEX. 0096199, SPN. 0342303, STZ. 0479093, SWD. 0332346, VZL. 0024014.

3,532,496.—XRGRPHC PLTS AND PROCS EMPLYNG HMGNUS DISPRSNS OF VTREOUS SLNIUM AND SNSTZNG DYES AS PHTCNDCTV LAYER. OCT. 6, 1970.

Class 2A 1G

3,288,603.—METHOD OF RESTORING XEROGRAPHIC PROPERTIES TO A GLASS BINDER PLATE. NOV. 29, 1966. CAN. 0800955, FRA. 1432127, GER. 1497201, GRB. 1088473, ITL. 0802168, JAP. 0519677.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,451,846.—PROCESS OF MAKING XEROGRAPHIC PLATE. JUNE 24, 1969. CAN. 0818384, GRB. 1183961, JAP. 0598621.

3,510,298.—PROCESS OF ACTIVATING PHOTOCONDUCTIVE MATERIAL IN GLASS BINDER. MAY 5, 1970. CAN. 0834668, GER. 1572366, GRB. 1189822, JAP. 0552968.

3,537,848.—PROCESS OF TREATING A XEROGRAPHIC GLASS BINDER PLATE AND PRODUCT. NOV. 3, 1970. ARG. 0180580.

3,655,376.—ELECTROPHOTOGRAPHIC DENITRIFIED GLASS BINDER PLATE. APR. 11, 1972.

3,885,962.—PHOTOGRAPHIC AND ELECTROPHOTOGRAPHIC MEMBERS WITH GLASS FIBER CONTAINING PAPER SUBSTRATES. MAY 27, 1975.

Class 2A 2

3,657,272.—PROCESS FOR PREPARING X-FORM METAL FREE PHTHALOCYANINE. APR. 18, 1972.

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,770,428.—ORGANIC PHOTOCONDUCTIVE MATERIAL. NOV. 6, 1973.

3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. GRB. 1414158, TIW. 0008534.

3,870,516.—METHOD OF IMAGING PHOTOCONDUCTOR IN CHARGE TRANSPORT BINDER. MAR. 11, 1975. AUS. 0466028, BEL. 0763541, CAN. 0931413, CHL. 0026797, EGR. 0094762, FRA. 7107559, GRB. 1343671, ITL. 0919108, MEX. 0122098, NZL. 0162883, PNM. 0002450, SAF. 0711219, SPN. 0388584, STZ. 0567744.

3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436.

3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975.

3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.

3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.

3,915,702.—PHTOELCTRC & ELCTRPHTGRPHC PGMNTS COMPRISING DERIVATIVES OF CONDENSED PLYCYLC ARMATC HYDRCABN A. OCT. 28, 1975.

3,915,704.—PHOTOINDUCED ACID CATALYZED DEGRADATION OF DEGRADABLE POLYMERS. OCT. 28, 1975.

3,917,483.—PHOTOINDUCED ACID CATALTZED DEPOLYMERIZATION OF DEGRADABLE POLYMERS. NOV. 4, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,926,629.—ELECTROPHOTOGRAPHIC METHOD AND PLATE EMPLOYING A PHTHALOCYANINE POLYMER. DEC. 16, 1975.

3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.

3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.

3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976.

3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436.

3,978,029.—PHOTOCONDUCTIVE COMPOSITIONS AND IMAGING MEMBERS AND METHODS EMPLOYING SAME. AUG. 31, 1976. ARG. 0206212, BEL. 0816552, FRA. 7422479, SAF. 0744129.

3,981,848.—PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHODS EMPLOYING SAME. SEPT. 21, 1976. ARG. 0206211, ATR. 0332734, FRA. 7422484.

4,043,812.—A PROCESS FOR PREPARATION OF 2-ANTHRYL & SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND POLY. AUG. 23, 1977. BEL. 822305, FRA. 7527053, STZ. 32598.

4,089,684.—IMAGING METHOD UTILIZING THE CHEMICAL REACTIVITY OF DONOR-ACCEPTOR MIXTURES. MAY 16, 1978.

4,117,239.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS & POLYMERS. SEPT. 26, 1978. BEL. 822305.

4,197,242.—POTASSIUM PHTHALOCYANINE COMPLEXES, METHOD OF PREPARATION, AND PHTHALOCYANINE PURIFICATION PROCESSES. APR. 8, 1980.

Class 2A 2A

3,408,181.—HEAT DEFORMABLE RECORDING MATERIALS CONTAINING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLE. OCT. 29, 1968. CAN. 0843620, FRA. 1463744, GER. 1522677, GRB. 1138552, ITL. 0755286, MEX. 0109927.

3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,482,970.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS USING NAPHTHYLAZO COMPOUNDS AS THE PRIMARY PHOTOCONDUCTOR. DEC. 9, 1969. AUS. 0453397, BEL. 0742978, CAN. 0869486, GRB. 1296390, ITL. 0878843, JAP. 0725059.

3,553,009.—PROCESS OF PREPARING AN ELECTROPHOTOGRAPHIC MATERIAL. JAN. 5, 1971.

3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.

3,640,710.—PHTHALOCYANINE PHOTOCONDUCTIVE ELEMENTS CONTAINING MULTIPLE BINDER MATERIALS. FEB. 8, 1972. ARG. 0184666, ATR. 0328861, AUS. 0456430, BEL. 0760751, CAN. 0933012, FRA. 7047636, GRB. 1333605, ITL. 0913999, PNM. 0002243, STZ. 0554550, SWD. 0365878, TIW. 0006738, USR. 0450420, VZL. 0032928.

3,667,943.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972. ARG. 0184823, AUS. 0452663, BEL. 0737810, CAN. 0877882, EGR. 0077411, FRA. 6928700, GRB. 1278702, ITL. 0888005, SPN. 0370720, STZ. 0519183, SWD. 0346396, TIW. 0005517, USR. 0351396.

3,667,944.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC RECORDING. JUNE 6, 1972. ARG. 0177369, AUS. 0452031, BEL. 0741159, CAN. 0884807, FRA. 6937223, GRB. 1286079, ITL. 0879710, JAP. 0693421, MEX. 0115407.

3,667,945.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972.

3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, GRB. 1396922, ITL. 0955644, MEX. 0128928.

3,708,293.—PI-FORM METAL-FREE PHTHALOCYANINE. JAN. 2, 1973. ARG. 0195167, BEL. 0783792, GRB. 1395769, ITL. 0955643, MEX. 0131970.

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

3,816,118.—ELECTROPHOTOGRAPHIC ELEMENT CONTAINING PHTHALOCYANINE. JUNE 11, 1974. ARG. 0156316, CAN. 0890855, FRA. 0091579, GRB. 1175451, ITL. 0809972, MEX. 0115884, VZL. 0024012.

3,850,630.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING INDIGOLD PIGMENTS. NOV. 26, 1974. ARG. 0188393, AUS. 0465971, BEL. 0763391, CAN. 0932198, CHL. 0027129, EGR. 0093923, FRA. 7107566, GRB. 1337221, ITL. 0919106, MEX. 0122099, NZL. 0162890, PNM. 0002480, SAF. 0711226, SPN. 0388591, TIW. 0006740, USR. 0463276.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515.

3,877,935.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING POLYNUCLEAR QUINONE PIGMENTS. APR. 15, 1975. ARG. 0002614, AUS. 0452620, BEL. 0763389, CAN. 0932197, CHL. 0027120, FRA. 7107563, GRB. 1337224, GUA. 0002614, ITL. 0919103, MEX. 0122100, NZL. 0162887, PNM. 0002467, SAF. 0711223, SPN. 0388588, TIW. 0006741.

3,884,689.—POLYCYCLIC AROMATIC POLYMER AS A PHOTO-CONDUCTOR OR OVERLAYER. MAY 20, 1975.

3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.

3,899,329.—MIXTURE OF PHOTOCONDUCTORS IN AN ACTIVE MATRIX. AUG. 12, 1975. ARG. 0187047, ATR. 327000, AUS. 0450862, BEL. 0775968, CAN. 0971797, CHL. 0027272, FRA. 7143179, GRB. 1348138, GUA. 0002724, ITL. 0941822, MEX. 1328040, PNM. 0002602, SAF. 0718022, SPN. 397403, STZ. 0026771.

3,904,407.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING PERYLENE PIGMENTS. SEPT. 9, 1975. ARG. 0189747, AUS. 0465811, BEL. 0763388, CAN. 0933010, CHL. 0026796, EGR. 0093458, FRA. 7107562, GRB. 1337225, GUA. 0002799, ITL. 0919102, MEX. 0126620, PNM. 0002468, SAF. 0711222, SPN. 0388587, SWD. 0362509, TIW. 0007210, USR. 0473381.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,927,026.—PROCESS OF MAKING X-FORM METAL PHTHALOCYANINE. DEC. 16, 1975. CAN. 0916703, GRB. 1312946, JAP. 0693981.

3,932,454.—PROCESS OF MAKING HEXAGONAL ALPHA METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. CAN. 0918152, GRB. 1327084, JAP. 0752724.

3,941,085.—RELEASE MATERIAL APPLICATOR. MAR. 2, 1976.

3,941,750.—POLYVINYL PYREMAL-AN INTRINSIC PHOTOCONDUCTOR AND ACTIVE MATRIX POLYMER. MAR. 2, 1976.

3,951,654.—MTHD ENHNCMT RATE AND EFFICIENCY OF PHOTODSCHG OF ELCTRPHGRIC IMAGING MEMBERS COMPRSNG PHTHALOCYA. APR. 20, 1976.

4,006,017.—PHOTOCONDUCTIVE COMPOSITION ARTICLE & PROESS. FEB. 1, 1977.

4,031,109.—METHOD FOR THE PREPARATION OF X-FORM METAL PHTHALOCYANINE AND X-FORM METAL FREE COMPOUNDS. JUNE 21, 1977. ARG. 0188048.

4,046,563.—PHOTOCONDUCTIVE COMPOSITION CONTAINING A TRICYANOPYREME, ARTICLE AND PROCESS OF USE. SEPT. 6, 1977. FRA. 7509147.

4,050,934.—ELECTRON ACCEPTOR MONOMERS & POLYMERS. SEPT. 27, 1977.

4,056,391.—METHOD FOR ENHANCING SOLID SOLUTION STABILITY OF ELECTRON ACCEPTOR MOLECULES AND ELECTROPHO. NOV. 1, 1977.

4,072,519.—PHOTOCONDUCTIVE COMPOSITION, AND ELEMENT. FEB. 7, 1978. FRA. 7509146.

4,076,528.—XEROGRAPHIC BINDER PLATE. FEB. 28, 1978. AUS. 456887, BEL. 775967, CAN. 971796, CHL. 27271, FRA. 7143178, GRB. 1358269, ITL. 941821, MEX. 124712, PNM. 2599, SAF. 718023, SPN. 397402, STZ. 26772.

4,092,161.—INORGANIC PHOTOCONDUCTORS WITH PHENYL SUBSTITUTED IMAGE TRANSPORT MATERIALS. MAY 30, 1978. AUS. 462805, BEL. 790689, CAN. 1007922, FRA. 7411475, GRB. 1462986, ITL. 969902, MEX. 133728, SPN. 407984, STZ. 28515, VZL. 33956.

4,098,795.—METHOD FOR THE PREPARATION OF X-FORM METAL FREE PHTHALOCYAMINE. JULY 4, 1978. ARG. 182328, BEL. 737989, CAN. 899870, FRA. 6928871, GER. 1943381, GRB. 1280843, ITL. 870314, JAP. 654041, MEX. 116011.

4,122,114.—1-TRICYANOINYLPYRENE. OCT. 24, 1978.

4,153,802.—ELECTRON ACCEPTOR MONOMERS AND POLYMERS. MAY 8, 1979. FRA. 7626102.

4,161,490.—ELECTRON ACCEPTOR MONOMERS. JULY 17, 1979. FRA. 7626102.

Class 2A 2B

3,408,182.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0847805, FRA. 1463743, GRB. 1137665, ITL. 0755290, JAP. 0572185, MEX. 0107318.

3,408,183.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0819066, FRA. 1463745, GER. 1522676, GRB. 1126048, ITL. 0755287, JAP. 0727091, MEX. 0106758.

3,408,184.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0818382, FRA. 1463727, GRB. 1137664, ITL. 0755289, JAP. 0726382, MEX. 0105835.

3,408,185.—ELECTROPHOTOGRAPHIC MATERIALS AND METHOD EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0848383, FRA. 1463728, GER. 1645192, GRB. 1137476, ITL. 0755291, MEX. 0106763.

3,408,186.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0846736, FRA. 1463746, GRB. 1138629, ITL. 0755288, JAP. 0569483, MEX. 0106589.

3,408,187.—ELECTROPHOTOGRAPHIC MATER AND METH EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0867298, GER. 1522721, GRB. 1163097, JAP. 0797719.

3,408,188.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS COMPRISING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0869485, GRB. 1183516, JAP. 0797720.

3,408,189.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968.

3,408,190.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0850019, GER. 1302772, GRB. 1182172.

3,879,201.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. APR. 22, 1975.

3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

4,033,769.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. JULY 5, 1977.

4,069,046.—POLYMERIZED VINYL CARBAZOLES SENSITIZED BY NITRO-SUGSTITUTED 9-DICYANOMETHYLENE FLUORENES. JAN. 17, 1978.

Class 2A 2C

4,019,902.—PHOTORECEPTOR FABRICATION. APR. 26, 1977.

Class 2A2E

4,099,969.—COATING METHOD TO IMPROVE ADHESION OF PHOTOCONDUCTORS. JULY 11, 1978.

Class 2B

3,617,265.—METHOD FOR PREPARING A RESIN OVERCOATED ELECTROPHOTOGRAPHIC PLATE. NOV. 2, 1971.

3,635,705.—MULTI-LAYERED HALOGEN-DOPED SELENIUM PHOTOCONDUCTIVE ELEMENT. JAN. 18, 1972. GRB. 1311329, ITL. 0901916, JAP. 0739531.

3,639,120.—2-LAYERED PHOTOCONDUCTIVE ELEMNT CONTNG A HALOGEN DOPED STORG LAYER AND SELENIUM ALLOY CNTRL LAYER. FEB. 1, 1972. CAN. 0870535, GRB. 1193876, JAP. 0558440.

3,655,377.—TRI-LAYERED SELENIUM DOPED PHOTORECEPTOR. APR. 11, 1972.

3,712,810.—AMBIPOLAR PHOTORECEPTOR AND METHOD. JAN. 23, 1973. CAN. 0971025, GRB. 1363266.

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.

3,848,994.—LINE CHARGE TONER CLEANING. NOV. 19, 1974.

3,928,034.—ELECTRON TRANSPORT LAYER OVER AN INORGANIC PHOTOCONDUCTIVE LAYER. DEC. 23, 1975. AUS. 0453265, BEL. 0763542, CAN. 0932199, CHL. 0026802, EGR. 0093924, FRA. 7107560, GRB. 1337227, GUA. 0002423, ITL. 0919109, MEX. 0121682, NZL. 0162884, PNM. 0002473, SAF. 0711220, SPN. 0388585, STZ. 0576659, SWD. 0363176, TIW.00 07181.

3,953,207.—A COMPOSITE LAYERED PHOTORECEPTOR. APR. 27, 1976.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.

4,007,100.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.

4,007,101.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.

4,012,251.—MULTI-LAYERED PHOTOCONDUCTIVE MEMBER. MAR. 15, 1977.

4,013,528.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,529.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,530.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,623.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAR. 22, 1977.

4,014,768.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 29, 1977.

4,016,058.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. APR. 5, 1977.

4,018,602.—METHOD FOR IN-SITU FABRICATION OF PHOTOCONDUCTIVE COMPOSITE. APR. 19, 1977.

4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.

4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

4,025,710.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAY 24, 1977.

4,028,203.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 7, 1977.

4,030,991.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,030,992.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,030,993.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,046,564.—ELECTROPHOTOGRAPHIC IMAGING MEMBERS WITH PHOTOCONDUCTIVE LAYER CONTAINING ELECTRON ACCEPTOR. SEPT. 6, 1977.

4,047,948.—COMPOSITE LAYERED IMAGING MEMBER FOR ELECTROPHOTOGRAPHY. SEPT. 13, 1977.

4,047,949.—COMPOSITE LAYERED IMAGING MEMBER FOR ELECTROPHOTOGRAPHY. SEPT. 13, 1977.

4,049,449.—METHOD FOR FORMING AN ELECTROPHOTOGRAPHIC MEMBER. SEPT. 20, 1977.

4,050,935.—TRIGONAL SE LAYER OVERCOATED BY BIS(4-DIETHYLAMINO-2-METHYLPHENYL) PHENYLMETANE CONTAINING. SEPT. 27, 1977. FRA. 7709994.

4,052,205.—PHOTOCONDUCTIVE IMAGING MEMBER WITH STUBSTITUTED ANTHRACENE PLASTICIZER. OCT. 4, 1977.

4,053,311.—POLY-L-VINYL CARBAZOLE IMAGE TRANSPORT LAYER PLASTICIZED OF BIS-(4-DIETHYLAMINO-2-METHYLPHE. OCT. 11, 1977.

4,062,886.—FLUORENONE CARBOXYLE ACID ESTERS. DEC. 13, 1977. FRA. 7621895.

4,063,947.—PHOTOCONDUCTIVE INSULATING FILMS COMPRISING FLUORENONE-SUBSTITUTED OLIGOMERS. DEC. 20, 1977.

4,075,012.—INTRACHAIN CHARGE TRANSFER COMPLEXES USE IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 21, 1977.

4,078,925.—A COMPOSITE LAYERED PHOTORECEPTOR. MAR. 14, 1978.

4,081,274.—COMPOSITE LAYERED PHOTORECEPTOR. MAR. 28, 1978.

4,098,984.—ELECTRON ACCEPTOR POLYMERS. JULY 4, 1978.

4,115,116.—IMAGING MEMBER HAVING A POLYCARBONATE-BIPHENYL DIAMINE CHARGE TRANSPORT LAYER. SEPT. 19, 1978.

4,116,691.—ELECTROPHOTOGRAPHIC IMAGING MEMBER OF MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS. SEPT. 26, 1978.
4,117,072.—PROCESS FOR ENHANCEMENT OF MECHANICAL PROPERTIES OF PHOTOCONDUCTIVE POLYMERS. SEPT. 26, 1978. FRA. 7531736. GRB. 1469371.
4,122,113.—9-FLUORENYL ACRYLATES. OCT. 24, 1978.
4,129,581.—MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS-PROCESS FOR PREPARATION AND USE. DEC. 12, 1978.
4,140,529.—CHARGE TRANSPORT OVERLAYER IN PHOTOCONDUCTIVE ELEMENT AND METHOD OF USE. FEB. 20, 1979.
4,143,225.—HOMOPOLYMERS OF A FLUORENONE DERIVATIVE HAVING PENDANT ELECTRON ACCEPTOR GROUPS. MAR. 6, 1979.
4,172,933.—MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS—PROCESS FOR PREPARATION AND USE. OCT. 30, 1979.

Class 2B 1

3,243,293.—PLATE FOR ELECTROSTATIC ELECTROPHOTOGRAPHY. MAR. 29, 1966. CAN. 0830430.
3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.
3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.
3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.
3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.
3,393,070.—XEROGRAPHIC PLATE WITH ELECTRIC FIELD REGULATING LAYER. JULY 16, 1968. CAN. 0871308, GER. 1490987, GRB. 1141452, JAP. 0764435, MEX. 0105660.
3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.
3,539,255.—XEROGRAPHIC RECORDING APPARATUS - LIGHT-CONTROLLED-CHARGE STORAGE LAYER. NOV. 10, 1970.
3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, SPN. 0379204, SWD. 0335063, USR. 0448658, VZL. 0029780.
3,619,153.—PHOTOCONDUCTIVE ELMNT AND PROCESS EMPLYNG SBSTUTD SILYLISOBUTYLETHYLENEDIAMINE ADHESIVE INTERLAYE. NOV. 9, 1971. ARG. 0180118, ATR. 0305764, AUS. 0434739, BEL. 0733402, BUL. 0017353, CAN. 0898034, DNK. 0131833, EGR. 0078900, FRA. 6917079, GRB. 1229559, GRK. 0040058, IND. 0121424, ISR. 0032250, ITL. 0864983, JAP. 0702563, LXB. 0058678, MEX. 0109385, NOR. 0125557, NZL. 0156506, PAK. 0121226, PLP. 0008481, PNM. 0001683, PTG. 0051754, RHD. 2236953, RMN. 0054256, SAF. 0693687, SPN. 0367618, STZ. 0511461, SWD. 0341926, TIW. 0006442, TRK. 0015647, USR. 0300036, VTM. 0001865.
3,713,821.—PHOTORECEPTOR INTERFACE. JAN. 30, 1973. ARG. 0194731, ATR. 0322357, AUS. 0464711, BEL. 0784453, CAN. 0964916, EGR. 0099870, FRA. 7220691, GRB. 1393612, ISR. 0039655, ITL. 0959793, SAF. 0723958, SPN. 0403454, STZ. 0554007, SWD. 0367491, VZL. 0032939.
3,720,514.—ELECTROPHOTOGRAPHIC PAPER HAVING AN IMONGANIC COLLOIDAL OXIDE COATING. MAR. 13, 1973.
3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.
3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.
3,795,513.—METHOD OF STORING AN ELECTROSTATIC IMAGE IN A MULTILAYERED PHOTORECEPTOR. MAR. 5, 1974. BEL. 0788303, CAN. 976018, FRA. 7230831, GRB. 1388934, ITL. 0964410, SWD. 7211341.
3,799,775.—XEROGRAPHIC SYSTEM. MAR. 26, 1974. ARG. 0172053, ATR. 0300559, AUS. 0423123, BEL. 0720940, BRA. 6800650, BUR. 0000043, CAM. 00043/3, CAN. 0895805, CHL. 0024257, EIR. 0032903, FRA. 1586238, GNR. 0000039, GRB. 1243384, GRK. 0039223, IND. 0119625, ISR. 0031543, ITL. 0844307, LEB. 0002816, LIB. P102693, LXB. 0056890, MEX. 0105163, MLG. 0003058, MLW. 00MW569, MNC. 8126975, MRC. 0014727, NOR. 0128132, NZL. 0153781, PAK. 0120895, PLP. 0009065, PNM. 0002053, PTG. 0050322, RHD. 5369487, SAF. 0681107, SPN. 0358355, STZ. 0506102, SWD. 0345530, TGR. 0000547, URG. 0009361, VTM. 0001830, VZL. 0023696, ZMB. 0156971.
3,816,288.—GLOW DISCHARGE TECHNIQUE FOR THE PREPARATION OF ELECTROPHOTOGRAPHIC PLATES. JUNE 11, 1974.
3,888,667.—HETROPHASE ADHESIVE COMPOSITIONS CONTAINING POLYSULFONE FOR METAL-SELENIUM COMPOSITIES. JUNE 10, 1975.
3,891,435.—HETEROPHASE ADHESIVE COMPOSITIONS CONTAINING CHLOROSULFONATED POLYETHLENE FOR METAL-SELENIUM CO. JUNE 24, 1975.
3,895,131.—ELECTROLESS COATING METHOD. JULY 15, 1975.
3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.
3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.
3,958,207.—INJECTION CURRENT DEVICE AND METHOD. MAY 18, 1976.
4,011,078.—PHOTOSENSITIVE MEMBER AND METHOD OF IMAGING. MAR. 8, 1977.
4,106,935.—XEROGRAPHIC PLATE HAVING AN PHTHALOCYANINE PIGMENT INTERFACE BARRIER LAYER. AUG. 15, 1978.

Class 2B 2

3,146,145.—PROCESS FOR ADHERING PLASTIC TO VITREOUS SELENIUM. AUG. 25, 1964.
3,256,089.—MASKED PLATE XEROGRAPHY. JUNE 14, 1966.
3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.
3,434,832.—XEROGRAPHIC PLATE COMPRISING A PROTECTIVE COATING OF A RESIN MIXED WITH A METALLIC STEARATE. MAR. 25, 1969. CAN. 0835883, FRA. 1454672, GER. 1497223, GRB. 1128156, ITL. 0772535, JAP. 0545757, MEX. 0085603.
3,488,189.—ELECTROPHOTOGRAPHIC RECORDING MEMBER HAVING SOLID CRYSTALLINE PLASTICIZR AVAILBL AT IMGNG SURFA. JAN. 6, 1970. CAN. 0866700, FRA. 1506810, GRB. 1183205, ITL. 0788976, JAP. 0570734, MEX. 0108241.
3,720,514.—ELECTROPHOTOGRAPHIC PAPER HAVING AN IMONGANIC COLLOIDAL OXIDE COATING. MAR. 13, 1973.
3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.
3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.
3,837,849.—MULTILAYERED VARIABLE SPEED PHOTORECEPTOR AND METHOD OF USING SAME. SEPT. 24, 1974. BEL. 0788302, CAN. 0978007, FRA. 7230830, GRB. 1401040, ITL. 0964409, SWD. 7211342.
3,850,630.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING INDIGOLD PIGMENTS. NOV. 26, 1974. ARG. 0188393, AUS. 0465971, BEL. 0763391, CAN. 0932198, CHL. 0027129, EGR. 0093923, FRA. 7107566, GRB. 1337221, ITL. 0919106, MEX. 0122099, NZL. 0162890, PNM. 0002480, SAF. 0711226, SPN. 0388591, TIW. 0006740, USR. 0463276.
3,856,548.—STRIPPABLE OVERCOATING FOR IMPROVED XEROGRAPHIC PLATES. DEC. 24, 1974. GRB. 1426030.
3,860,421.—N-ALKYL MORPHOLINE TREATMENT OF A SELENIUM-CONTAINING PHOTOCONDUCTIVE LAYER. JAN. 14, 1975.
3,868,983.—HAND TOOL. MAR. 4, 1975.
3,877,935.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING POLYNUCLEAR QUINONE PIGMENTS. APR. 15, 1975. ARG. 0002614, AUS. 0452620, BEL. 0763389, CAN. 0932197, CHL. 0027120, FRA. 7107563, GRB. 1337224, GUA. 0002614, ITL. 0919103, MEX. 0122100, NZL. 0162887, PNM. 0002467, SAF. 0711223, SPN. 0388588, TIW. 0006741.
3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.
3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.
3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.

3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, GRB. 1437041.

3,904,407.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING PERYLENE PIGMENTS. SEPT. 9, 1975. ARG. 0189747, AUS. 0465811, BEL. 0763388, CAN. 0933010, CHL. 0026796, EGR. 0093458, FRA. 7107562, GRB. 1337225, GUA. 0002799, ITL. 0919102, MEX. 0126620, PNM. 0002468, SAF. 0711222, SPN. 0388587, SWD. 0362509, TIW. 0007210, USR. 0473381.

3,912,511.—MULTICOMPONENT ORGANIC COATING OF POLYESTER POLYURETHAND AND HUMIDITY. OCT. 14, 1975. ARG. 0182692, BEL. 0767325, CAN. 0938143, FRA. 7118948, GRB. 1350476, ITL. 0926822, MEX. 0121668.

3,954,464.—METHOD OF FABRICATING A COMPOSITE TRIGONAL SELENIUM PHOTORECEPTOR. MAY 4, 1976.

3,961,953.—METHOD OF FABRICATING COMPOSITES TRIGONAL SELENIUM PHOTORECEPTORS. JUNE 8, 1976.

3,973,843.—ELECTROSTATOGRAPHIC IMAGING APPARATUS. AUG. 10, 1976. AUS. 0467835, BEL. 0802879, GRB. 1437041.

4,006,019.—METHOD FOR PREPARATION OF AN ELECTROSTATOGRAPHIC PHOTORECEPTOR. FEB. 1, 1977.

4,006,020.—OVERCOATED ELECTROSTATOGRAPHIC PHOTORECEPTOR. FEB. 1, 1977.

4,012,255.—OVERCOATED ELECTROSTATOGRAPHIC PHOTORECEPTOR. MAR. 15, 1977.

4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.

4,064,514.—PORTABLE CAMERA. DEC. 20, 1977.

4,072,521.—AMIDES OF W AND CIS ALKENOIC ACIDS IN IMAGING PROCESS AND ELEMENT. FEB. 7, 1978.

4,073,649.—DI CARBOXYLIC ACID BIS AMIDES AND IMPROVED IMAGING PROCESS. FEB. 14, 1978.

4,076,641.—W- AND CIS ALKENOIC ACID AMIDES IN ELECTROSTATOGRAPHIC DEVELOPERS. FEB. 28, 1978.

4,099,968.—DICARBOXYLIC ACID BIS-AMIDES IN ELECTROSTATIC IMAGING COMPOSITIONS AND PROCESSES. JULY 11, 1978.

4,123,269.—ELECTROSTATOGRAPHIC PHOTOSENSITIVE DEVICE COMPRISING HOLE INJECTING AND HOLE TRANSPORT LAYER. OCT. 31, 1978.

4,126,455.—ELECTROSTATOGRAPHIC IMAGING PROCESS AND RELATED APPARATUS. NOV. 21, 1978. AUS. 467835. BEL. 802879. CAN. 995963. FRA. 7328588. GRB. 1437041. ITL. 991465. SPN. 417382. USR. 637099.

4,147,541.—ELECTROSTATIC IMAGING MEMBER WITH ACID LUBRICANT. APR. 3, 1979. AUS. 467835. BEL. 802879. CAN. 995963. FRA. 7328588. GRB. 1437041. ITL. 991465. SPN. 417382. USR. 637099.

4,181,772.—ADHESIVE GENERATOR OVERCOATED PHOTORECEPTORS. JAN. 1, 1980.

Class 2B 3

3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.

3,543,031.—DEVICE AND PROCESS FOR IMAGE STORAGE. NOV. 24, 1970. ARG. 0161299, AUS. 0432468, BEL. 0703461, CAN. 0862332, FRA. 1543309, GER. 1549142, GRB. 1201374, ITL. 0811521, JAP. 0742514, MEX. 0100142, SPN. 0344004, STZ. 0497022, SWD. 0354169, VZL. 0023663.

Class 2B 4

3,428,453.—IMAGE FORMING PROCESS UTILIZING XEROGRAPHY-ETCHING PROCESS. FEB. 18, 1969. CAN. 0856722, FRA. 1428775, GRB. 1085151, ITL. 0754825.

3,446,616.—XEROGRAPHIC IMAGING EMPLOYING A SELECTIVELY REMOVABLE LAYER. MAY 27, 1969.

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

4,007,372.—IMPROVED METHOD & ARTICLE FOR IMAGE REPRODUCTION. FEB. 8, 1977.

4,011,078.—PHOTOSENSITIVE MEMBER AND METHOD OF IMAGING. MAR. 8, 1977.

Class 2C

3,307,941.—PLASTIC DEFORMATION IMAGING FILM AND PROCESS. MAR. 7, 1967. CAN. 0801262.

3,317,316.—INTERNAL FROST RECORDING. MAY 2, 1967. ATR. 0272830, AUS. 0292886, BEL. 0648043, CAN. 0882890, FRA. 1399017, GER. 1243018, GRB. 1069741, ITL. 0725002, JAP. 0521009, LXB. 0046101, NOR. 0122729, STZ. 0469292, SWD. 0319083.

3,408,181.—HEAT DEFORMABLE RECORDING MATERIALS CONTAINING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLE. OCT. 29, 1968. CAN. 0843620, FRA. 1463744, GER. 1522677, GRB. 1138552, ITL. 0755286, MEX. 0109927.

3,443,937.—IMAGE RESOLUTION. MAY 13, 1969. CAN. 0824316, GRB. 1137766, JAP. 0544235.

3,443,938.—FROST IMAGING EMPLOYING A DEFORMABLE ELECTRODE. MAY 13, 1969. CAN. 0801263, FRA. 1441806, GRB. 1073097, JAP. 0573732.

3,526,879.—INTERNAL FROST RECORDING APPARATUS USING A DEFORMABLE PHOTOCONDUCTOR. SEPT. 1, 1970.

3,672,883.—CRYSTALLINE POLYMERS FOR FROST. JUNE 27, 1972.

3,672,886.—NOVOLAR RESINS IN DEFORMATION IMAGING. JUNE 27, 1972.

3,707,391.—IMAGING PROCESS. DEC. 26, 1972.

3,873,197.—APPARATUS FOR REGULATING THE TONER CONCENTRATION IN A ELECTROPHOTOGRAPHIC DEVICE. MAR. 25, 1975.

3,892,567.—ELECTROSTATICALLY DEFORMABLE MATERIALS. JULY 1, 1975. ARG. 0196065, BEL. 0781973, CAN. 9814520, FRA. 7213876, GRB. 1394286, ITL. 0951328, MEX. 0124825.

3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.

3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.

3,980,476.—IMAGING SYSTEM. SEPT. 14, 1976.

3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.

4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

4,054,381.—TONER FILTER ARRANGEMENT. OCT. 18, 1977.

4,065,031.—PROGRAMMABLE DEVELOPMENT CONTROL SYSTEM. DEC. 27, 1977.

4,093,369.—CLEANING SYSTEM. JUNE 6, 1978.

Class 2D

3,411,903.—XEROGRAPHIC METHOD AND PLATE COMPRISING PHOTOCONDUCTIVE INSULATING FIBERS. NOV. 19, 1968. ARG. 0149620, ATR. 0270379, AUS. 0410718, BEL. 0672668, BRA. 0084119, CAN. 0834669, CHL. 0023648, CLB. 0014943, DNK. 0120577, EGR. 0055545, FRA. 1464792, GER. 1497224, GRB. 1084024, GRK. 0031509, IND. 0102560, ISR. 0024632, ITL. 0734376, JAP. 0724233, LXB. 0049849, MEX. 0098487, NOR. 0122817, NZL. 0143432, PLD. 0067959, PLP. 0004547, PNM. 0001533, PRU. 0008384, PTG. 0044879, SAF. 0656280, SPN. 0319795, STZ. 0458076, SWD. 0308250, THL. 1084024, TIW. 0003735, URG. 0006624, VZL. 0023996.

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974.

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

4,045,413.—POSSIBLE ACTIVE MATRIX POLYMERS. AUG. 30, 1977. FRA. 7432710.

4,130,274.—PNEUMATIC REGISTRATION APPARATUS. DEC. 19, 1978. BEL. 847912. SAF. 6401.

Class 2E

3,341,681.—XEROGRAPHIC PLATE FABRICATION. SEPT. 12, 1967. CAN. 0780598, FRA. 1415795, GRB. 1070555, HOL. 0144068, IND. 0094992, ITL. 0738063.

3,350,203.—XEROGRAPHIC PLATE. OCT. 31, 1967. CAN. 0715017, FRA. 1421950, GER. 1270400, GRB. 1085989, ITL. 0750417, JAP. 0511420.

3,447,957.—METHOD OF MAKING A SMOOTH SURFACED ADHESIVE BINDER XEROGRAPHIC PLATE. JUNE 3, 1969. CAN. 0788947.

3,468,705.—METHOD OF PREPARING LEAD OXIDE FILMS. SEPT. 23, 1969. CAN. 0806134, FRA. 1501511, GER. 1521942, GRB. 1170428, ITL. 0787638, JAP. 0634868, MEX. 0093335.

3,472,679.—COATING SURFACES. OCT. 14, 1969. CAN. 0896992.

3,536,397.—XEROGRAPHIC APPARATUS. OCT. 27, 1970. CAN. 0917231.

3,536,481.—ELECTROLYTIC PROCESS OF FORMING A XEROGRAPHIC BELT. OCT. 27, 1970. ARG. 0175659, AUS. 0416583, BEL. 0716410, CAN. 0865080, FRA. 1572605, GRB. 1200670, ITL. 0859021, MEX. 0103043, SWD. 0345698.

3,536,485.—XEROGRAPHIC PLATE SUPPORTED BY A MANDREL. OCT. 27, 1970.
3,578,445.—XEROGRAPHIC PLATE FABRICATION. MAY 11, 1971.
3,634,134.—METHOD OF MAKING A PHOTOCONDUCTIVE COMPOSITION AND DEVICE. JAN. 11, 1972. ARG. 0184074, ATR. 0307226, AUS. 449514, BEL. 0752440, CAN. 0904111, EGR. 0083703, FRA. 7023473, GRB. 1319342, ITL. 0894622, MEX. 0117839, PNM. 0002547, SPN. 0381111, STZ. 0548624, SWD. 0351734, TIW. 0007153.
3,695,757.—XEROGRAPHIC PLATE. OCT. 3, 1972.
3,746,571.—METHOD OF VACUUM EVAPORATION. JULY 17, 1973.
3,752,691.—METHOD OF VACUUM EVAPORATION. AUG. 14, 1973.
3,756,811.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING PHOTOCONDUCTIVE MATERIALS OF DIFFERENT DYNAMIC RANGES. SEPT. 4, 1973. CAN. 0894715, GRB. 1226578.
3,787,208.—XEROGRAPHIC IMAGE MEMBER HAVING PHOTOCONDUCTIVE MATERIAL IN INTERLOCKING CONTINUOUS PATHS. JAN. 22, 1974. ARG. 0186443, ATR. 0451252, BEL. 0763544, CAN. 0925741, CHL. 0026794, FRA. 7107567, GRB. 1296291, ITL. 0918909, MEX. 0122096, NZL. 0162891, PLP. 0009378, PNM. 0002396, SAF. 0711227, SPN. 0388639, STZ. 0568591, SWD. 0367259, TIW. 0007844, USR. 0398062.
3,788,889.—METHOD OF PREPARING BINDER LAYERS. JAN. 29, 1974.
3,837,906.—METHOD OF MAKING A XEROGRAPHIC BINDER LAYER AND LAYER SO PREPARED. SEPT. 24, 1974. ARG. 0186444, ATR. 0319750, AUS. 0448147, BEL. 0763392, CAN. 0939204, CHL. 0027098, FRA. 7107568, GRB. 1292425, ITL. 0918910, NZL. 0162892, PNM. 0002439, SAF. 0711228, SPN. 0388640, STZ. 0558554, SWD. 0036479, TIW. 0007713.
3,856,548.—STRIPPABLE OVERCOATING FOR IMPROVED XEROGRAPHIC PLATES. DEC. 24, 1974. GRB. 1426030.
3,894,868.—ELECTRON TRANSPORT BINDER STRUCTURE. JULY 15, 1975. AUS. 0461951, BEL. 0763543, CAN. 0932196, CHL. 0026795, EGR. 0096346, FRA. 7107561, GRB. 1337226, GUA. 0002467, ITL. 0919110, MEX. 0120807, NZL. 0162885, PNM. 0002481, SAF. 0711221, SPN. 0388586, TIW. 0007182, USR. 0444380.
3,911,091.—MILLING TRIGONAL SELENIUM PARTICLES TO IMPROVED XEROGRAPHIC PERFORMANCE. OCT. 7, 1975.
3,911,162.—SYSTEM FOR VAPOR DEPOSITION OF THIN FILMS. OCT. 7, 1975. BEL 0798324.
3,926,762.—R F SPUTTERING OF TRIGONAL SELENIUM FILM. DEC. 16, 1975.
3,944,682.—METHOD OF PROVIDING AN ELECTROPHOTOGRAPHIC COATING AND COMPOSITIONS FOR METHOD. MAR. 16, 1976.
3,945,723.—RESILIENT ROLLERS. MAR. 23, 1976. ARG. 0205448.
3,954,466.—ELECTROSTATOGRAPHIC PHOTORECEPTOR. MAY 4, 1976.
3,979,495.—METHOD OF MAKING A PHOTORECPTOR. SEPT. 7, 1976.
3,984,183.—SHEET STRIPPING FROM IMAGING SURFACE. OCT. 5, 1976. BEL. 0836791.
3,992,091.—ROUGHENED IMAGING SURFACE FOR CLEANING. NOV. 16, 1976.
4,014,697.—ELECTROSTATOGRAPHIC IMAGING MEMBER. MAR. 29, 1977.
4,014,728.—METHOD OF MAKING AN IMAGING MEMBER. MAR. 29, 1977.
4,015,985.—COMPOSITE XEROGRAPHIC PHOTORECPTOR WITH INJECTING CONTACT LAYER. APRIL 5, 1977. BEL. 0840221.
4,016,310.—COATR HRDWR AND METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.
4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.
4,025,188.—PHOTOACTIVE DEVICE FOR XEROGRAPHY. MAY 24, 1977.
4,033,768.—METHOD FOR THE PREPARATION OF AN ELECTROSTATOGRAPHIC PHOTOSENSITIVE DEVICE. JULY 5, 1977.
4,047,973.—RECOVERY OF SELENIUM AND SELENIUM ALLOYS BY HUDRAULIC LATHING. SEPT. 13, 1977.
4,071,363.—METHOD OF MAKING COMPOSITE XEROGRAPHIC PHOTORECEPTOR WITH INJECTING CONTACT LAYER FOR A PHO. JAN. 31, 1978. BEL. 840221. FRA. 7610576.
4,072,518.—METHOD OF MAKING TRIGONAL SELENIUM INTERLAYERS BY GLOW DISCHARGE. FEB. 7, 1978.
4,076,183.—PHOTOCONDUCTOR INCREMENTING APPARATUS. FEB. 28, 1978.
4,076,564.—ROUGHENED IMAGING SURFACE FOR CLEANING. FEB. 28, 1978.
4,103,994.—RECORDING PLATE. AUG. 1, 1978.
4,115,115.—CRYSTALLIZATION OF SELENIUM IN POLYMER MATRICES VIA IN SITU GENERATION OF ORGANIC CRYSTALLIZATION. SEPT. 19, 1978.
4,122,030.—FORMATION OF COLLOIDAL DISPERSIONS OF SELENIUM BY THE LOCUS CONTROL METHOD. OCT. 24, 1978.
4,126,457.—EVAPORATION TECHNIQUE FOR PRODUCING TEMPERATURE PHOTORECEPTOR ALLOYS. NOV. 21, 1978. CAN. 1046864.
4,175,959.—PRECIPITATION OF PARTICULATE TRIGONAL SILENIUM FOR USE IN ELECTROPHOTOGRAPHY. NOV. 27, 1979. CAN. 1054339, GRB. 1510737.
4,192,603.—REPLENISHABLE PHOTOCONDUCTOR SYSTEM. MAR. 11, 1980.
4,206,994.—BELT TENSIONING SYSTEM. JUNE 10, 1980.

Class 2F

3,143,044.—XEROGRAPHIC PLATE HOLDER. AUG. 4, 1964.
3,592,071.—BELT TRACKING APPARATUS. JULY 13, 1971. ARG. 0179666, BEL. 0751117, CAN. 0925118, FRA. 7019040, GRB. 1298926, ITL. 0893540, JAP. 0770135, MEX. 0118981, SPN. 0380136.
3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,820,888.—MISTRACK INTERLOCK FOR SELENIUM BELT. JUNE 28, 1974.
3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,874,790.—FAIL-SAF MECH STPNG MVMNT PHTCNDCTV BLT ELTRSTC REPRDCTN MACH WHEN TRCKNG BECOMES IREGULAR AND UN. APR. 1, 1975.
3,888,577.—APPARATUS FOR PACKAGING AND SUBSEQUENTLY INSTALLING A BELT ONTO A ROLLER ASSEMBLY. JUNE 10, 1975. BEL. 0810900.
3,994,053.—DRUM SUPPORT APPARATUS. NOV. 30, 1976.
4,005,285.—OPTICAL SYSTEM FOR EXTENDING PHOTOSENSOR ARRAY RESOLUTION. JAN. 25, 1977.
4,009,388.—ARRANGEMENT FOR EXTENDING PHOTOSENSOR ARRAY SOLUTION. FEB. 22, 1977.
4,027,966.—TRACKING ASSEMBLY FOR AN ENDLESS BELT ELECTROSTATIC REPRODUCTION MACHINE. JUNE 7, 1977.
4,040,157.—DRUM SUPPORT APPARATUS. AUG. 9, 1977.
4,068,942.—ADVANCED PHOTORECEPTOR. JAN. 17, 1978. BEL. 847264, FRA. 7630970.
4,088,403.—REPLENISHABLE PHOTOSENSITIVE SYSTEM. MAY 9, 1978.
4,105,345.—EXPANDABLE PHOTORECEPTOR ENDBELLS. AUG. 8, 1978.
4,120,576.—DRUM SUPPORT APPARATUS. OCT. 17, 1978.
4,174,171.—BELT TRACKING SYSTEM. NOV. 13, 1979.
4,178,094.—BELT SUPPORT AND STEERING MODULE. DEC. 11, 1979.
4,189,223.—A STEERING AND SUPPORTING SYSTEM FOR A PHOTOCONDUCTIVE BELT. FEB. 19, 1980.
4,197,002.—PNEUMATIC SYSTEM FOR SUPPORTING AND STEERING BELT. APR. 8, 1980.
4,198,155.—PHOTOCONDUCTIVE BELT ASSEMBLY. APR. 15, 1980.

Class 3

3,935,517.—CONSTANT CURRENT CHARGING DEVICE. JAN. 27, 1976.

Class 3A

3,172,024.—CHARGE INDUCTION. MAR. 2, 1965. CAN. 0809341, FRA. 1294161, GER. 1414991, GRB. 0958663, JAP. 0455338.
3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.
3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.
3,684,364.—LIFTOFF ELECTRODE. AUG. 15, 1972.

3,842,273.—CORONA GENERATOR CLEANING APPARATUS. OCT. 15, 1974. AUS. 0480142, BEL. 0817485. GRB. 1458088, SPN. 0428358.
3,884,181.—CAPILLARY BAFFLE-CONSTANT OIL HEIGHT INDEPENDENT TO OIL LEVEL. MAY 20, 1975.
3,893,800.—BACKSIDE HEATING AND FIXING APP IN AN ELECTRONIC PHOTOGRAPH DUPLICATOR. JULY 8, 1975.
3,957,423.—STRIPPER FINGER DESIGN. MAY 18, 1976.
4,049,344.—ELECTROSTATIC IMAGING SYSTEM. SEPT. 20, 1977.
4,082,444.—LAMP CARRIAGE DRIVE SYSTEM. APR. 4, 1978.

Class 3B

3,160,746.—CORONA CHARGING APPARATUS FOR NON-UNIFORMLY CHARGING A XEROGRAPHIC PLATE IN A PREDETERMINED MAN. DEC. 8, 1964. GER. 1197475, GRB. 1011793, JAP. 0484759.
3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.
3,449,568.—CORONA DISCHARGE APPARATUS FOR CREATING AN ELECTROSTATIC CHARGE PATTERN ON A XEROGRAPHIC SURFAC. JUNE 10, 1969. CAN. 0858664.
3,532,494.—SOLID AREA DEVELOPMENT IN XEROGRAPHY EMPLOYING AN INSULATING SCREEN IN THE CHARGING STEP. OCT. 6, 1970.
3,543,022.—METH AND APPARATUS CHARG DISCRETE SMALL AREAS XEROGRAPHIC PLATES TO DIF POTENT CONT TONE PRINTG. NOV. 24, 1970. CAN. 0921971, GRB. 1186599.
3,784,299.—DARK DECAY RETARDATION. JAN. 8, 1974.
3,981,498.—NON-UNIFORM CHARGING OF SHEET MATERIAL. SEPT. 21, 1976.
4,043,656.—TRANSPARENCY COPYING MACHINE. AUG. 23,1977.
4,073,587.—COROTRON APPARATUS. FEB. 14, 1978.
4,095,233.—METHOD FOR FORMING A CHARGE PATTERN. JUNE 13, 1978.

Class 3C

3,122,634.—CONTROLLED CHARGING IN XEROGRAPHIC COPYING APPARATUS. FEB. 25, 1964. CAN. 0706543, FRA. 1352624, GER. 1210323, GRB. 1026262, JAP. 0446815.
3,160,746.—CORONA CHARGING APPARATUS FOR NON-UNIFORMLY CHARGING A XEROGRAPHIC PLATE IN A PREDETERMINED MAN. DEC. 8, 1964. GER. 1197475, GRB. 1011793, JAP. 0484759.
3,335,274.—XIC CHARGING APPARATUS WITH MEANS TO AUTOMATICALLY CONTROL THE POT ENTAIL APPLIED TO THE CORONA. AUG. 8, 1967. CAN. 0801834, FRA. 1459487, GRB. 1121498, ITL. 0734870, MEX. 0085777.
3,382,360.—XIC CHARGING SYSTEM HAVING MEANS FOR PROVIDING AN AIR CUSHION BETWEEN CHARGING DEVICE AND XIC DR. MAY 7, 1968.
3,457,405.—CORONA WIRE MOUNTING MEANS WHICH COMPENSATES FOR WIRE EXPANSION DUE TO HEAT. JULY 22, 1969. CAN. 0857406, GRB. 1196927.
3,471,695.—CORONA CHGNG APPTS W/MEANS TO URGE A FLOW OF AERIFORM FLUID ACROSS THE CORONA WIRES. OCT. 7, 1969. CAN. 0856355, GRB. 1220745.
3,483,372.—CORONA CHARGING DEVICE WITH CONDUCTIVE SHIELD AND INSULATING MEANS ON SAID SHIELD. DEC. 9, 1969. CAN. 0840508, GRB. 1169632, JAP. 0770817.
3,517,995.—METHOD AND APPARATUS FOR INCREASING THE EFFICIENCY OF CORONA CHARGNG. JUNE 30, 1970. ARG. 0172471, BEL. 0721553, CAN. 0856714, FRA. 1585283, GRB. 1247034, ITL. 0844214, JAP. 0708414, MEX. 0103113, VZL. 0023701.
3,566,108.—CORONA GENERATING ELECTRODE STRUCTURE FOR USE IN A XEROGRAPHIC CHARGING METHOD. FEB. 23, 1971.
3,598,991.—ELCTRSTC CHRGNG DEV HAVNG SPRK GAP VOLTG REGULTR BETWEEN A CORONA SOURCE AND VOLTG SOURCE. AUG. 10, 1971. AUS. 0457211, BEL. 0754426, CAN. 0916233, CZC. 0163219, EGR. 0084558, FRA. 7029148, GRB. 1322378, ITL. 0901159, JAP. 0715800, PLD. 0070053, SPN. 0382404, STZ. 0513436, SWD. 0359663, TIW. 0007173, USR. 0442617.
3,604,925.—APPARATUS FOR CONTROLLING THE AMOUNT OF CHARGE APPLIED TO SURFACE. SEPT. 14, 1971.
3,612,864.—IMAGING SYSTEM UTILIZING AN ELECTRODE TREATED W/MIXTURE OF HYDROSCOPIC MATERIAL AND HYDROPHILIC B. OCT. 21, 1971.
3,675,011.—METHODS AND APPARATUS FOR OPERATING RAISED COROTRONS OF OPPOSITE POLARITY. JULY 4, 1972.
3,723,793.—COATED CORONA GENERATING ELECTRODE. MAR. 27, 1973.
3,742,237.—AC CORONA CHARGING APPARATUS. JUNE 26, 1973. CAN. 0955299, GRB. 1387209.
3,760,229.—A C COROTRON. SEPT. 18, 1973. GRB. 1410671.
3,769,506.—CORONA GENERATING METHOD AND APPARATUS THEREFOR. OCT. 30, 1973.
3,790,999.—CORONA WIRE APPARATUS. FEB. 12, 1974.
3,800,153.—ELECTROPHOTOGRAPHY CHARGING DEVICE. MAR. 26, 1974.
3,813,547.—CORONA GENERATING APPARATUS. MAY 28, 1974.
3,813,548.—CORONA GENERATING METHODS AND APPARATUS THEREFOR. MAY 28, 1974.
3,816,749.—EXPOSURE CONTROLLED CORONA DEVICE. JUNE 11, 1974.
3,851,229.—CURRENT MEASURING DEVICE. NOV. 26, 1974.
3,870,883.—ELECTROSTATIC PRINTING MACHINE WITH SELF-CLEANING CORONAL GENERATING DEVICE. MAR. 11, 1975.
3,901,189.—MAGNETIC BRUSH DEVELOPING APPARATUS. AUG. 26, 1975.
3,919,605.—CORONA DISCHARGE APPARATUS. NOV. 11, 1975.
3,922,548.—CORONA CHARGING DEVICE AND SUPPORT ARRANGEMENT. NOV. 25, 1975.
3,937,960.—CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. FEB. 10, 1976.
3,939,386.—TECHNIQUE FOR CHARGING DIELECTRIC SURFACES TO HIGH VOLTAGE. FEB. 17, 1976.
3,950,680.—ELECTROSTATOGRAPHIC DIAGNOSTIC SYSTEM. APR. 13, 1976.
3,976,880.—CORONA STABILIZATION ARRANGEMENT. AUG. 24, 1976.
3,976,881.—ARRANGEMENT FOR STABILIZING CORONA DEVICES. AUG. 24, 1976.
3,978,379.—CORONA GENERATING DEVICE WITH AN IMPROVED CLEANING MECHANISM. AUG. 31, 1976.
3,983,393.—CORONA DEVICE WITH REDUCED OZONE EMISSION. SEPT. 28, 1976.
3,996,466.—TRANSFER CORONA DEVICE WITH ADJUSTABLE SHIELD BIAS. DEC. 7, 1976.
4,027,960.—TRANSFER SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. JUNE 7, 1977.
4,038,544.—IMPROVED APPARATUS AND METHOD FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. JULY 26, 1977.
4,038,546.—AN IMPROVED APPARATUS FOR A CORONA GENERATING DEVICE. JULY 26, 1977.
4,056,723.—ROTATIABLE CORONA DEVICE. NOV. 1, 1977.
4,068,284.—CORONA DISCHARGE DEVICE. JAN. 10, 1978. CAN. 1029794, FRA. 7432708, GRB. 1407718.
4,072,413.—ELECTROSTATOGRAPHIC REPRODUCTION METHODS AND MACHINES. FEB. 7,1978.
4,099,219.—CORONODE TENSIONING AND SUPPORT ARRANGEMENT. JULY 4, 1978.
4,100,411.—BIASING ARRANGEMENT FOR A CORONA DISCHARGE DEVICE. JULY 11, 1978.
4,110,811.—SUPPORT STRUCTURE FOR A CORONA GENERATING DEVICE. AUG. 29, 1978.
4,112,298.—CORONA WIRE MOUNTING MEANS. SEPT. 5, 1978.
4,112,299.—CORONA DEVICE WITH SEGMENTED SHIELD. SEPT. 5, 1978. GRB. 1499477.
4,118,751.—CORONODE CONNECTION ARRANGEMENT. OCT. 3, 1978.
4,138,719.—AUTOMATIC WRITING SYSTEMS AND METHODS OF WORD PROCESSING. FEB. 6, 1979. CAN. 1055161. GRB. 1530444.

Class 3C 1

3,275,837.—XEROGRAPHIC CHARGING APPARATUS. SEPT. 27, 1966. ARG. 0158430, ATR. 0242511, AUS. 0276177, BEL. 0642095, CAN. 0753356, FRA. 1385736, GER. 1488286, GRB. 1040264, ITL. 0712888, JAP. 0477814, MEX. 0075819, STZ. 0460930, SWD. 0314133.
3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.

3,492,476.—ELECTROSTATIC CHARGING DEVICE UTILIZING BOTH AC AND DC FIELDS. JAN. 27, 1970. ARG. 0175174, ATR. 0300573, AUS. 0425768, BEL. 0729976, CAN. 0862232, CHL. 0024600, CZC. 0158639, DNK. 0126728, EGR. 0081574, EIR. 0032976, FRA. 6907701, GRB. 1255998, GRK. 0039915, IND. 0120218, ISR. 0031765, ITL. 0860063, LXB. 0058234, MEX. 0108894, NOR. 0129709, NZL. 0155636, PAK. 0120995, PLD. 0017649, PLP. 0007523, PNM. 0001813, PTG. 0051315, RHD. 1096947, RMN. 0055216, SAF. 0691730, SPN. 0364888, STZ. 0493014, SWD. 0341528, UAR. 0009212, USR. 0318248, VTM. 0001845, VZL. 0023731.

3,873,895.—TECHNIQUE FOR CHARGING DIELECTRIC SURFACES TO HIGH VOLTAGE. MAR. 25, 1975.

3,886,416.—METHOD AND APPARATUS FOR ADJUSTING COROTRON CURRENTS. MAY 27, 1975.

3,908,164.—CORONA CURRENT MEASUREMENT AND CONTROL ARRANGEMENT. SEPT. 23, 1975.

3,921,042.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED CORONA GENERATING DEVICE. NOV. 18, 1975.

3,961,193.—SELF ADJUSTING CORONA DEVICE. JUNE 1, 1976.

3,984,182.—PRETRANSFER CONDITIONING FOR ELECTROSTATIC PRINTING. OCT. 5, 1976.

4,038,593.—REGULATED HIGH VOLTAGE AC POWER SUPPLY WITH REGULATED DC BIAS CURRENT. JULY 26, 1977. BEL. 0846572.

4,039,257.—PRETRANSFER COROTRON SWITCHING. AUG. 2, 1977. GRB. 1498259

4,042,874.—HIGH VOLTAGE AC POWER SUPPLY WITH AUTOMATICALLY VARIABLE DC BIAS CURRENT. AUG. 16, 1977.

4,057,723.—COMPACT CORONA CHARGING DEVICE. NOV. 8, 1977. BEL. 850335, SPN. 455179.

4,086,650.—CORONA CHARGING DEVICE. APR. 25, 1978. BEL. 844116, SAF. 764178, SPN. 449789.

4,110,614.—CORONA DEVICE. AUG. 29, 1978.

Class 3C 2

3,304,476.—TRANSFER SWITCH FOR A XEROGRAPHIC APPARATUS. FEB. 14, 1967.

3,433,948.—NEGATIVE CORONA DISCHARGE SYSTEM USING ALTERNATING ELECTRIC FIELDS ACROSS THE AIR GAP. MAR. 18, 1969. CAN. 0855811, FRA. 1564157, GRB. 1211442, ITL. 0829718, JAP. 0655407.

3,541,329.—NEGATIVE CORONA DEVICE WITH MEANS FOR PRODUCING A REPELLING ELECTROSTATIC FIELD. NOV. 17, 1970. CAN. 0841136, FRA. 1546256, GRB. 1205040, JAP. 0634886.

4,140,874.—AUTOMATIC COMPENSATING CIRCUIT. FEB. 20, 1979. CAN. 1056919. GRB. 1522703.

Class 3C 3

3,146,385.—XEROGRAPHIC PLATE CHARGING METHOD AND APPARATUS. AUG. 25, 1964. GRB. 1013924.

3,649,830.—UNIFORM CHARGING METHOD AND APPARATUS USING AN ARRAY OF NEEDLE ELECTRODES. MAR. 14, 1972.

3,655,966.—ELECTRIC CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. APR. 11, 1972.

3,689,767.—METHOD AND APPARATUS FOR UNIFORMLY CHARGING THE SURFACE OF AN INSULATING MEMBER. SEPT. 5, 1972.

3,709,595.—PRINTER SYSTEM. JAN. 9, 1973.

Class 3C 4

3,220,324.—PHOTOCONDUCTIVELY CONTROLLED CORONA CHARGING. NOV. 30, 1965. CAN. 0710976, GER. 1243967, GRB. 1034009, JAP. 0651092.

3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.

3,492,476.—ELECTROSTATIC CHARGING DEVICE UTILIZING BOTH AC AND DC FIELDS. JAN. 27, 1970. ARG. 0175174, ATR. 0300573, AUS. 0425768, BEL. 0729976, CAN. 0862232, CHL. 0024600, CZC. 0158639, DNK. 0126728, EGR. 0081574, EIR. 0032976, FRA. 6907701, GRB. 1255998, GRK. 0039915, IND. 0120218, ISR. 0031765, ITL. 0860063, LXB. 0058234, MEX. 0108894, NOR. 0129709, NZL. 0155636, PAK. 0120995, PLD. 0017649, PLP. 0007523, PNM. 0001813, PTG. 0051315, RHD. 1096947, RMN. 0055216, SAF. 0691730, SPN. 0364888, STZ. 0493014, SWD. 0341528, UAR. 0009212, USR. 0318248, VTM. 0001845, VZL. 0023731.

3,496,351.—CORONA CONTROL CIRCUIT FOR STEPPING XEROGRAPHIC RECORDNG APPARATUS. FEB. 17, 1970. CAN. 0834978, FRA. 1512919, GRB. 1170472, ITL. 0793742, JAP. 0923309.

3,688,107.—ELECTROSTATOGRAPHIC CHARGING APPARATUS. AUG. 29, 1972. CAN. 0938660, GRB. 1365130.

3,875,407.—CORONA GENERATOR CLEANING APPARATUS. APR. 1, 1975.

3,908,127.—CORONA GENERATING DEVICES. SEPT. 23, 1975.

3,909,614.—SCOROTRON POWER SUPPLY CIRCUIT. SEPT. 30, 1975.

3,936,635.—CORONA GENERATING DEVICE. FEB. 3, 1976.

Class 3C 5

3,970,381.—METHOD AND APPARATUS FOR XEROGRAPHIC REPRODUCTION. JULY 20, 1976. BEL. 0811188.

Class 3C 6

3,549,962.—UNIFORM ELECTROSTATIC CHARGING. DEC. 22, 1970. CAN. 0897757, GRB. 1189578.

3,648,133.—UNIFORM ELECTROSTATIC CHARGING OF A PHOTOCONDUCTIVE INSULATING SURFACE. MAR. 7, 1972.

3,743,830.—DEVICE FOR UNIFORMLY CHARGING A NON PLANAR ELECTROPHOTOGRAPHIC PLATE. JULY 3, 1973.

3,764,866.—CORONA GENERATOR. OCT. 9, 1973. ARG. 0198185, ATR. 0325420, AUS. 0467386, BEL. 0793227, CZC. 0168018, DNK. 0131699, FRA. 7245484, GRB. 1402739, ITL. 0972692, MEX. 0128581, NZL. 0169420, PTG. 0058386, SAF. 0729029, STZ. 0553435, SWD. 7216596.

3,792,913.—XEROGRAPHIC ERASE MECHANISM. FEB. 19, 1974. GRB. 1422175.

3,811,048.—ELECTROPHOTOGRAPHIC CHARGING APPARATUS. MAY 14, 1974.

3,967,119.—CORONA CHARGING DEVICE. JUNE 29, 1976.

3,967,891.—IMAGING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. JULY 6, 1976.

4,087,168.—CHARGING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. APR. 2, 1978.

Class 3C 7

3,323,373.—ESCAPEMENT MECHANISM. JUNE 6, 1967. CAN. 0841310.

3,324,291.—CORONA GENERATING DEVICE W/MEANS TO CAUSE AIR FLOW THERE-THROUGH TO MAINTN PARTS FREE OF DUST. JUNE 6, 1967. CAN. 0794904, GRB. 1070615, JAP. 0512648.

3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.

3,496,352.—SELF-CLEANING CORONA GENERATING APPARATUS. FEB. 17, 1970. CAN. 0856356, GRB. 1227987, JAP. 0641478.

3,743,540.—SURFACE CLEANING BY IONIZED FLOW. JULY 3, 1973.

3,794,839.—CORONA GENERATING APPARATUS. FEB. 26, 1974. GRB. 1434863.

3,942,006.—CORONA GENERATOR CLEANING APPARATUS. MAR. 2, 1976.

3,965,400.—CORONA GENERATING DEVICE WITH IMPROVED BUILT IN CLEANING MECHANISM. JUNE 22, 1976.

4,019,055.—CORONA CLEANING ASSEMBLY. APR. 19, 1977. BEL. 0795870, GRB. 1416480.

Class 3C 8

3,335,273.—XIC CHARGING APPARATUS W/MEANS TO TERMINATE CHARGING CYCLE WHEN A PREDETERMINED CHARGE IS OBTAI. AUG. 8, 1967. CAN. 0794905, FRA. 1462556, GRB. 1128618, ITL. 0743940, JAP. 0632530, MEX. 0087314.

3,335,275.—XIC CHARGNG APPTS W/ADJSTBL MEANS TO TERMINATE CHRGNG CYCLE WHEN PRE-DETERMINED CHARGE IS OBTAI. AUG. 8, 1967. CAN. 0801833.

3,667,036.—ELECTROMETER AMPLIFIER CIRCUITS. MAY 30, 1972.

3,678,350.—ELECTRIC CHARGING METHOD. JULY 18, 1972.

3,805,069.—REGULATED CORONA GENERATOR. APR. 16, 1974.

3,934,141.—APPARATUS FOR AUTOMATICALLY REGULATING THE AMOUNT OF CHARGE APPLIED TO AN INSULATING SURFACE. JAN. 20, 1976.
3,944,356.—A CHARGING APPARATUS. MAR. 16, 1976.
3,980,929.—CORONA CURRENT INTERRUPTER. SEPT. 14, 1976.

Class 3C 9

3,557,367.—METHOD AND APPARATUS FOR INCREASING THE EFFICIENCY OF CORONA CHARGING OF A PHOTOCONDUCTOR. JAN. 19, 1971. ARG. 0170822, BEL. 0720017, BRA. 6800368, CAN. 0879279, FRA. 1597512, GRB. 1244378, ITL. 0840366, JAP. 0628391, MEX. 0105427, VZL. 0023699.
3,582,731.—CHARGING SYSTEM. JUNE 1, 1971. CAN. 0906045.
3,765,026.—ELECTROGRAPHIC RECORDING SYSTEM. OCT. 9, 1973. CAN. 0948272, GRB. 1365346.
4,049,344.—ELECTROSTATIC IMAGING SYSTEM. SEPT. 20, 1977.

Class 3D

3,394,002.—CHARGE TRANSFER WITH LIQUID LAYERS. JULY 23, 1968. CAN. 0840028, GRB. 1126048, JAP. 0524527.
3,398,336.—ELECTRICAL CHARGING UTILIZING TWO PHASE LIQUID MEDIUM. AUG. 20, 1968. CAN. 0815738, GRB. 1149074, JAP. 0562387.
3,687,106.—DONOR APPARATUS AND METHOD. AUG. 29, 1972. ARG. 0185079, BEL. 0753207, CAN. 0911706, FRA. 7027124, GRB. 1314862, ITL. 0900444, JAP. 0733285, MEX. 0117318, PNM. 0002237, VZL. 0027517.
3,907,559.—IMGNG PRCS EMPLYNG FRCTN CHRGNG IN THE PRESENCE OF AN ELECTRICALLY INSULATING DEVELOPER LIQUID. SEPT. 23, 1975.
3,971,658.—IMAGING PROCESS EMPLOYING FRICTION CHARGING IN THE PRESENCE OF AN ELECTRICALLY INSULATING LIQUID. JULY 27, 1976.

Class 3E

3,172,024.—CHARGE INDUCTION. MAR. 2, 1965. CAN. 0809341, FRA. 1294161, GER. 1414991, GRB. 0958663, JAP. 0455338.
3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.

Class 3F

3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.
3,453,427.—ELEC LAMP FOR UNIFRMLY CHRGNG THE PHOTOCNDCTIVE INSULATNG LAYER OF A XEROGRAPHIC PLATE. JULY 1, 1969.
3,481,669.—PHOTO-CHARGING OF XEROGRAPHIC PLATES. DEC. 2, 1969. AUS. 0420860, BEL. 0705167, CAN. 0814631, FRA. 1541297, GER. 1522683, GRB. 1088073, JAP. 0517512.
3,687,538.—APPARATUS FOR EXPOSING LATENT IMAGE MARGINS IN ELECTROPHOTOGRAPHIC COPYING APPARATUS. AUG. 29, 1972.
3,751,155.—PRE-DEVELOPMENT EXPOSURE ASSEMBLY. AUG. 7, 1973.
3,809,472.—PRE-DEVELOPMENT EXPOSURE ASSEMBLY. MAY 7, 1974. ARG. 0196103, AUS. 0466757, BEL. 0793559, CHL. 0027991, FRA. 7246234, GRB. 1415170, ITL. 0973319, JAP. 0552841, MEX. 0131207, NZL. 0169421, PRU. 0013334, PTG. 0058769, SAF. 0729132, SPN. 0410172, STZ. 0552841, SWD. 7216970.
3,845,307.—COMBINED CORONA AND LUMINESCENT DISCHARGE. OCT. 29, 1974. BEL. 0811310, GRB. 1433663.
3,860,338.—ADJUSTABLE FADEOUT. JAN. 14, 1975. BEL. 0809655.
3,893,419.—BACKGROUND REDUCTION TECHNIQUE. JULY 8, 1975.
3,984,842.—DEVICE FOR CONTINOUS ELECTROSTATIC REPRODUCTION OF AN OPTICAL IMAGE. OCT. 5, 1976.
3,994,000.—DEVICE FOR ELECTROSTATOGRAPHIC REPRODUCTION OF AN OPTICAL IMAGE USING A CHARGE STORAGE GRID. NOV. 23, 1976.
4,005,438.—DEVICE WITH CONTROL GRID FOR ELECTROSTATOGRAPHIC REPRODUCTION OF AN OPTICAL IMAGE. JAN. 25, 1977.

Class 4

4,162,118.—WAVEGUIDE IMAGING SYSTEM. JULY 24, 1979.

Class 4A

3,811,764.—APPARATUS FOR PHOTOELECTROPHORETIC IMAGING USING A PERIODIC ELECTRIC FIELD. MAY 21, 1974.
4,068,950.—VARIABLE PLATEN COVER. JAN. 17, 1978.
4,111,541.—EXPOSURE SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINES. SEPT. 5, 1978.
4,120,579.—IMAGING SYSTEM FOR A PHOTOCOPYING DEVICE. OCT. 17, 1978.

Class 4A 1

3,330,180.—ILLUMINATION CONTROL SYSTEM. JULY 11, 1967. ARG. 0151653, BRA. 0084295, CAN. 0785137, FRA. 1450157, GER. 1264239, GRB. 1122629, ITL. 0730678, JAP. 0508404, MEX. 0078870.
3,432,231.—EXPOSURE CONTROL DEVICE. MAR. 11, 1969.
3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.
3,487,252.—CESIUM LIGHT SOURCE. DEC. 30, 1969.
3,504,969.—IMAGING APPARATUS. APR. 7, 1970.
3,512,886.—DUAL CARRIAGE SCANNING SYS. MAY 19, 1970. CAN. 0875712, GRB. 1235136.
3,586,849.—ILLUMINATION SYSTEM. JUNE 22, 1971. ARG. 0183139, ATR. 0303522, AUS. 0428629, BEL. 0733400, BRA. 6908480, CAN. 0903730, CHL. 0024870, FRA. 6917011, GRB. 1260688, ITL. 0864185, MEX. 0111515, NOR. 0125954, NZL. 0156507, PNM. 0001430, PRU. 0010320, PTG. 0051752, SAF. 0693689, SPN. 0367616, STZ. 0758269, SWD. 0354924, VZL. 0025067.
3,622,217.—LIGHT PRODUCING SYSTEM. NOV. 23, 1971.
3,733,599.—TRIGGERING APPARATUS FOR A FLASH LAMP. MAY 15, 1973. CAN. 0937281, GRB. 1361073.
3,746,442.—ELECTROPHOTOGRAPHIC IMAGING APPARATUS. JULY 17, 1973.
3,767,956.—APERTURE FLUORESCENT LAMP FOR COPYING MACHINES. OCT. 23, 1973.
3,777,135.—ILLUMINATION SYSTEM. DEC. 4, 1973.
3,779,640.—HEATING APPARATUS FOR SCAN LAMP. DEC. 18, 1973. ITL. 0995677.
3,781,585.—LIGHT PRODUCING SYSTEM. DEC. 25, 1973.
3,824,013.—LIGHT SOURCE ALIGNMENT DEVICE. JULY 16, 1974.
3,851,201.—LAMP ASSEMBLY. NOV. 26, 1974.
3,868,182.—LAMP ASSEMBLY. FEB. 25, 1975.
3,869,205.—ILLUMINATION SOURCE FOR XEROGRAPHIC EXPOSURE. MAR. 4, 1975.
3,881,817.—OPTICAL ALIGNMENT SYSTEM FOR AN ORIGINAL DOCUMENT. MAY 6, 1975. CAN. 3881817.
3,893,754.—COMBINATION PARABOLOID-ELLIPSOID MIRROR SYSTEM. JULY 8, 1975.
3,904,290.—OPTICAL SYSTEM ALIGNMENT APPARATUS. SEPT. 9, 1975.
3,909,254.—LASER RECORDING METHOD. SEPT. 30, 1975.
3,914,649.—PULSED METAL OR METAL HALIDE LAMPS FOR PHOTOCOPYING APPLICATIONS. OCT. 21, 1975.
3,961,222.—SODIUM VAPOR LAMP CONFIGURATION. JUNE 1, 1976.
3,967,893.—AN ILLUMINATING APPARATUS. JULY 6, 1976.
3,983,441.—MULTIPLE PINCH INCANDESCENT LAMP. SEPT. 28, 1976.
3,992,108.—OPTICAL SYSTEM ALIGNMENT APPARATUS. NOV. 16, 1976.
3,998,539.—AN ILLUMINATION SYSTEM. DEC. 21, 1976.
4,005,332.—EFFICIENT DC OPERATED FLUORESCENT LAMPS. JAN. 25, 1977.
4,005,940.—OPTICAL SYSTEM ALIGNMENT APPARATUS. FEB. 1, 1977.
4,071,798.—SODIUM VAPOR LAMP WITH EMISSION APERTURE. JAN. 31, 1978.
4,071,799.—SODIUM VAPOR LAMP WITH EMISSION APERTURE. JAN. 31, 1978.
4,072,417.—EXPOSURE DEVICE FOR A XEROGRAPHIC COPYING MACHINE. FEB. 7, 1978.
4,080,545.—SODIUM VAPOR LAMP. MAR. 21, 1978.
4,086,010.—ILLUMINATION SYSTEM UTILIZING TWO OPPOSING DC LAMPS WITH AN OPTIMUM BARREL-SHAPED SLIT. APR. 25, 1978.
4,113,379.—ILLUMINATION APPARATUS FOR ELECTRONIC COPYING MACHINES. SEPT. 12, 1978.
4,128,332.—ILLUMINATOR. DEC. 5, 1978. GRB. 1494424.

4,140,385.—LOW PRESSURE METAL OR METAL HALIDE LAMPS FOR PHOTOCOPYING APPLICATIONS. FEB. 20, 1979.
4,190,355.—FACETTED REFLECTION. FEB. 26, 1980. BEL. 875979.

Class 4A 2

3,381,573.—SCANNING ATTACHMENT. MAY 7, 1968. CAN. 0820036, GER. 1945460, GRB. 1134645, JAP. 0524529.
3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.
3,888,581.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,582.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,584.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,585.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,901,594.—SEMI-AUTOMATIC DOCUMENT HANDLER. AUG. 26, 1975.
3,930,724.—MASKING APPARATUS FOR A MULTI-COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JAN. 6, 1976.

Class 4A 2A

3,560,089.—PLATEN COVER. FEB. 2, 1971. BEL. 0736415, CAN. 0910104, FRA. 0024759, GRB. 1245543, ITL. 8691460, JAP. 0674392.
3,560,090.—PLATEN COVER. FEB. 2, 1971. CAN. 0910103.
3,615,134.—COUNTERBALANCED AND SELF-CLOSING PLATEN COVER. OCT. 26, 1971. ARG. 0185533, AUS. 0449673, BEL. 0756482, CAN. 0921744, CHL. 0025836, EGR. 0084323, FRA. 7035445, GRB. 1318753, GUA. 0002610, ITL. 0908279, MEX. 0116804, PLD. P143518, PNM. 0002181, SPN. 0384046, STZ. 0515525, TIW. 0006830, USR. 0439097.
3,642,371.—PLATEN COVER FOR COPYING MACHINE. FEB. 15, 1972. ARG. 0189873, BEL. 0768991, CAN. 0938485, FRA. 7124554, ITL. 0932443.
3,642,376.—REMOVABLE PLATEN COVER. FEB. 15, 1972. CAN. 0926919.
3,685,905.—COMBINED DOCUMENT FEED AND BOOK COPYING APPARATUS. AUG. 22, 1972. ARG. 0189167, BEL. 0782370, CAN. 0954579, FRA. 7214327, GRB. 1382646, ITL. 0959701, MEX. 0127002, VZL. 30688.
3,788,737.—LUMINESCENT COVER. JAN. 29, 1974. FRA. 7336535.
3,813,161.—PLATEN COVER. MAY 28, 1974.
3,860,338.—ADJUSTABLE FADEOUT. JAN. 14, 1975. BEL. 0809655.
3,914,043.—COLOR ACCENTING COPYING MACHINE. OCT. 21, 1975.
3,914,049.—OPTICAL SCANNING SYSTEM. OCT. 21, 1975. BEL. 0815416.
3,930,466.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. JAN. 6, 1976.
3,936,172.—LIQUID CRYSTALLINE PLATEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. FEB. 3, 1976.
3,997,265.—PLATEN COVER. DEC. 14, 1976.
4,045,218.—METHOD FOR ELECTROSTATICALLY PRODUCING A COLOR ACCENTED PHOTOCOPY. AUG. 30, 1977.
4,072,418.—DEVICE FOR PREVENTING MOVEMENT OF AN ORIGINAL DOCUMENT ON A RECIPROCATING COPIER PLATEN. FEB. 7, 1978.
4,111,540.—FIELD LENS FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 5, 1978.
4,118,119.—FACETTED EDGE FADEOUT REFLECTOR. OCT. 3, 1978.

Class 4A 3

3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,672,759.—ILLUMINATION CONTROL SYSTEM. JUNE 27, 1972.
3,775,008.—OPTICAL SCANNING APPARATUS. NOV. 27, 1973.
3,829,209.—IMAGE REGISTRATION IN A MULTIPLE MAGNIFICATION PHOTOCOPY INH SYSTEM. AUG. 13, 1974. ARG. 0194481, BEL. 0784522, CAN. 0988146, FRA. 7220688, GRB. 1397446, ITL. 0956415, MEX. 0128160, SPN. 403.700, STZ. 0563605, SWD. 7207535.
3,926,518.—OPTICAL SCANNING SYSTEM. DEC. 16, 1975.
3,947,117.—EXPOSURE CONTROL SYSTEM. MAR. 30, 1976.
3,975,289.—CHARGE TRANSFER COMPLEXE OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
3,995,954.—EXPOSURE SYSTEM. DEC. 7, 1976.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.
4,080,071.—EXPOSURE DEVICE OF A COPYING MACHINE. MAR. 21, 1978.
4,098,552.—COPYING MACHINE. JULY 4, 1978.
4,101,807.—METHOD AND APPARATUS FOR CONTROLLING THE TEMPERATURE OF LOW PRESSURE METAL OR METAL HALIDE. JULY 18, 1978.

Class 4B

3,912,387.—ELECTROSTATOGRAPHY. OCT. 14, 1975.
3,967,894.—A SCREENED OPTICAL SYSTEM. JULY 6, 1976.
3,967,895.—ILLUMINATION CONTROL SYSTEM. JULY 6, 1976.
3,981,577.—AN OPTICAL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 21, 1976.
3,994,723.—ELECTROPHOTOGRAPHIC PROCESS INVOLVING STEP OF SUBSEQUENT DISCHARGE OF AREAS RECEIVING INSUFFICIENT. NOV. 30, 1976.
4,134,671.—INTERSECTING OPTICAL AND COPY SHEET PATH METHOD AND APPARATUS. JAN. 16, 1979.

Class 4B 1

3,062,094.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962. JAP. 0286655.
3,062,095.—PROJECTOR OPTICAL SCANNING SYSTEM. NOV. 6, 1962. CAN. 0706050.
3,062,108.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962.
3,076,392.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 5, 1963. CAN. 0689623, FRA. 1271754, GER. 1209418, GRB. 0962654.
3,137,202.—OPTICAL SCANNING APPARATUS FOR XEROGRAPHIC PRINTERS. JUNE 16, 1964. CAN. 0685880.
3,221,622.—OPTICAL SCANNING SYSTEM. DEC. 7, 1965. ADN. 0000471, ARG. 0150818, ATR. 0267325, AUS. 0402541, BEL. 0657557, BRS. 00J3737, BRU. 0000469, CAN. 0756354, EIR. 0028649, FIJ. 0000342, FIN. 0045258, FRA. 1420763, GER. 1497089, GHA. 0000994, GIB. 1089536, GIE. 0006969, GRB. 1089536, GRK. 0029663, GUR. 1089536, HGK. 0009169, HOL. 0146615, ISR. 0022618, ITL. 0742392, JAP. 0599246, JER. 0000P96, KEN. 0001744, LXB. 0047657, MAU. 1927571, MLS. 0015069, NIG. 0001619, NOR. 0118726, NZL. 0140371, PTG. 0043364, SAF. 0646113, SBH. 0005269, SGP. 0008269, SHL. 0000017, SLN. 2677286, SPN. 0307501, SRK. 0000389, STZ. 0450920, SWD. 0338716, UGD. 0000269.
3,318,186.—OPTICAL SYSTEM FOR REPRODUCTION MACHINES. MAY 9, 1967. CAN. 0798356, FRA. 1467332, GRB. 1139231, ITL. 0758313, JAP. 0512656, MEX. 0085288, SWD. 6912062.
3,381,573.—SCANNING ATTACHMENT. MAY 7, 1968. CAN. 0820036, GER. 1945460, GRB. 1134645, JAP. 0524529.
3,405,564.—PULLEY. OCT. 15, 1968. CAN. 0850353.
3,454,335.—SCANNING SYSTEM. JULY 8, 1969. BEL. 0708647, CAN. 0853453, FRA. 1549127, GRB. 1207850, ITL. 0819656, JAP. 0591210.
3,484,163.—SCANNING SYSTEM. DEC. 16, 1969. CAN. 0840630.
3,504,969.—IMAGING APPARATUS. APR. 7, 1970.
3,512,886.—DUAL CARRIAGE SCANNING SYS. MAY 19, 1970. CAN. 0875712, GRB. 1235136.
3,523,725.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 11, 1970. CAN. 0917730, GRB. 1271862.
3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.
3,552,221.—SPEED CONVERTING MECHANISM. JAN. 5, 1971.
3,591,277.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 6, 1971. AUS. 0428584, BEL. 0723949, CAN. 0869628, CZC. 0157352, FRA. 1591801, GER. 0989774, GRB. 1223429, ITL. 0856815, SWD. 0348060, USR. 0465805.
3,612,679.—SCANNING APPARATUS. OCT. 12, 1971. GRB. 1307918.
3,671,237.—METHOD FOR PRODUCING IMAGES. JUNE 20, 1972. CAN. 0886492, GRB. 1317043.
3,794,418.—IMAGING SYSTEM. FEB. 26, 1974.

3,832,057.—SCANNING APPARATUS. AUG. 27, 1974. GRB. 1417255.
3,858,976.—OPTICAL SCANNING SYSTEM. JAN. 7, 1975.
3,869,204.—SCANNING OPTICAL SYSTEM. MAR. 4, 1975. BEL. 0815215.
3,905,247.—CLUTCHES. SEPT. 16, 1975.
3,918,806.—DASHPOT FOR COPIER OPTICAL SCANNING. NOV. 11, 1975.
3,936,173.—OPTICAL SYSTEM. FEB. 3, 1976.
3,948,374.—CLUTCHES. APR. 6, 1976.
3,950,091.—APPARATUS FOR CONTROLLING MOVEMENT OF A CARRIAGE. APR. 13, 1976.
3,973,825.—FLAT FIELD SCANNING SYSTEM. AUG. 10, 1976. BEL. 0836735.
3,989,369.—SCANNING MECHANISM FOR A COPYING APPARATUS. NOV. 2, 1976.
4,027,961.—COPIER/RASTER SCAN APPARATUS. JUNE 7, 1977.
4,032,231.—MULTIPLE RANGE VARIABLE MAGNIFICATION REPRODUCTION MACHINE USING THREE-DIMENSIONAL CAM. JUNE 28, 1977. BEL. 0843419.
4,054,359.—APPARATUS FOR SYNCHRONOUSLY SCANNING A FLAT PLATEN WITH A ROTATING MIRROR USING PULLEYS. OCT. 18, 1977.
4,066,353.—HALF TONE IMAGING SYSTEM. JAN. 3, 1978.
4,067,640.—APPARATUS FOR SYNCHRONOUSLY SCANNING A FLAT PLATEN WITH A ROTATING MIRROR. JAN. 10, 1978.
4,068,940.—VARIABLE CONTRAST OPTICAL SCREENING SYSTEM. JAN. 17, 1978.
4,068,950.—VARIABLE PLATEN COVER. JAN. 17, 1978.
4,070,089.—TWO DIMENSIONAL LASER SCANNER WITH MOVABLE CYLINDER LENS. JAN. 24, 1978.
4,093,374.—MULTIPLE RANGE VARIABLE MAGNIFICATION REPRODUCTION MACHINE. JUNE 6, 1978. BEL. 843419, GRB. 1500877, SPN. 449267.
4,095,880.—EXTENDED RANGE VARIABLE MAGNIFICATION REPRODUCTION MACHINE. JUNE 20, 1978. BEL. 843419, GRB. 1500877, SPN. 449267.
4,143,311.—HYSTERESIS SYNCHRONOUS MOTOR RATE SERVO SYSTEM. MAR. 6, 1979.
4,161,359.—APPARATUS FOR SYNCHRONIZING MOVEMENT BETWEEN AN OPTICAL SCANNING SYSTEM AND AN IMAGING MEMBER. JULY 17, 1979.

Class 4B 1A

3,139,013.—DOCUMENT REPRODUCING APPARATUS. JUNE 30, 1964. CAN. 0727819, FRA. 1346596, GRB. 1016265, JAP. 0442652.
3,330,190.—PRINTING APPARATUS. JULY 11, 1967. CAN. 0758791, GER. 1280282, GRB. 1102419, JAP. 0529726.
3,438,704.—ILLUMINATION CONTROL SYSTEM. APR. 15, 1969. CAN. 0865838, GRB. 1209473, JAP. 1002842.
3,485,546.—FIELD FLATTENER SCANNING MEANS. DEC. 23, 1969. CAN. 0850916, GRB. 1196373, JAP. 0667705.
3,504,960.—SAGITTAL RAY APERTURE STOP. APR. 7, 1970. AUS. 0413558, BEL. 0704924, CAN. 0849815, FRA. 1540700, GRB. 1209472, ITL. 0814606, JAP. 0972613.
3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.
3,542,467.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 24, 1970. ARG. 0180116, AUS. 0442029, BEL. 0731552, BRA. 6908056, CAN. 0877451, FRA. 6911558, GRB. 1257103, ITL. 0857659, JAP. 0668806, MEX. 0108892, SPN. 0366056, SWD. 0346397, VZL. 0023746.
3,592,531.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JULY 13, 1971. CAN. 0929389.
3,640,615.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 8, 1972. ARG. 0174792, AUS. 0428440, BEL. 0723948, CAN. 0884439, FRA. 1596660, GRB. 1223428, ITL. 0847541, JAP. 0992414, MEX. 0108966, PNM. 0001806, SPN. 0360210, SWD. 0352456, VZL. 0023711.
3,652,157.—MICROFILM PROJECTION APPARATUS. MAR. 28, 1972. CAN. 0937797, GRB. 1324097.
3,655,284.—LONGITUDINALLY INSENSITIVE LENS STRIP IMAGING DEVICE. APR. 11, 1972.
3,670,633.—RECORDING APPARATUS. JUNE 20, 1972.
3,778,147.—ELECTROSTATIC REPRODUCTION MACHINE HAVING SLEECTSBLE MAGNIFICATION-RATIOS. DEC. 11, 1973. CAN. 989464.
3,788,740.—IMAGING SYSTEM. JAN. 29, 1974.
3,975,289.—CHARGE TRANSFER COMPLEXEX OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
3,994,580.—OPTICAL SYSTEM FOR SCANNING DURING RECIPROCAL MOTION. NOV. 30, 1976.
4,008,958.—OPTICAL SYSTEM FOR EFFECTED IMAGE ROTATION. FEB. 22, 1977.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.
4,029,409.—MULTI-MODE OPTICAL SCANNING SYSTEM. JUNE 14, 1977. BEL. 0843153, HAT. 0001524.
4,088,401.—OPTICAL SYSTEM FOR ALTERNATIVELY PROJECTING ADJACENT IMAGES OF ADJACENT OBJECTS OR DOUBLE I. MAY 9, 1978.
4,103,991.—OPTICAL SYSTEM FOR SCANNING DURING RECIPROCAL MOTION PROVIDING 180 ROTATION OF IMAGE. AUG. 1, 1978.
4,134,670.—HIGH CAPACITY PHOTOCOPY OPTICAL SCANNING SYSTEM. JAN. 16, 1979.
4,195,928.—TWO DIRECTION SCAN SORTING TECHNIQUE. APR. 1, 1980.

Class 4B 1A 1

3,544,190.—LENS STRIP OPTICAL SCANNING SYSTEM. DEC. 1, 1970. CAN. 0904070, GRB. 1278336.
3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.
3,584,952.—LENS STRIP OPTICAL SCANNING SYSTEM - REISSUED D 2074R. JUNE 15, 1971.
3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.
3,650,621.—OPTICAL IMAGING SYSTEM. MAR. 21, 1972. BEL. 0747978, CAN. 0927470, FRA. 7011548, GRB. 1297907, ITL. 0898936, JAP. 0731225.
3,881,369.—BI-AXIAL POSITIONER. MAY 6, 1975.
3,912,392.—SHORT FOCAL LENGTH OPTICAL SCANNING SYSTEM. OCT. 14, 1975.

Class 4B 1A 2

3,496,846.—SCRIPTWRITER USING FIBER OPTIC BUNDLE. FEB. 24, 1970.
3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,681,777.—RECORDING APPARATUS. AUG. 1, 1972.

Class 4B 1A 3

3,120,790.—XEROGRAPHIC EXPOSURE APPARATUS. FEB. 11, 1964. AUS. 0270483, FRA. 1333280, GER. 1204066, GRB. 1019291, ITL. 0674895, JAP. 0468454.
3,497,296.—XEROGRAPHIC EXPOSURE APPARATUS. FEB. 24, 1970.
3,535,036.—APPARATUS FOR FORMING HALF-TONE LINE SCREEN WITH A LENS. OCT. 20, 1970. CAN. 0909309, GRB. 1253887.
3,540,806.—HALF TONING METH AND APPARATUS FOR SOLID AREA COVERAG. NOV. 17, 1970. CAN. 0892754, GRB. 1253888.
3,580,671.—EXPOSURE APPARATUS. MAY 25, 1971. CAN. 0912104, GRB. 1276010.
3,905,822.—COMPOUND SCREEN FOR OBJECT SCREENING. SEPT. 16, 1975.
3,912,510.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A COMPOUND DOCUMENT SCREEN. OCT. 14, 1975.
3,914,040.—REVERSIBLE SCREEN FOR ELECTROPHOTOGRAPHIC PRINTING. OCT. 21, 1975.
3,958,877.—HALF-TONE SCREEN WITH CLEANING MEANS FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAY 25, 1976.
3,961,847.—AN ARCUATE SCREEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 8, 1976.
3,961,848.—AN ELECTROPHOTOGRAPHIC PRINTING MACHINE WITH HALFTONE SCREEN CLEANING. JUNE 8, 1976.
3,963,342.—CURVED SCREEN. JUNE 15, 1976.
3,973,953.—IMAGING METHOD INCLUDING EXPOSURE OF PHOTOCONDUCTIVE IMAGING MEMBER THROUGH LENTICULAR LENS ELE. AUG. 10, 1976. STZ. 0557051.
3,973,954.—IMAGING METHOD INCLUDING EXPOSURE OF PHOTOCONDUCTIVE IMAGING MEMBER THROUGH LENTICULAR LENS ELE. AUG. 10, 1976. STZ. 0557051.
3,973,957.—IMAGING METHOD INCLUDING EXPOSURE OF DEFORMATION IMAGING MEMBER THROUGH LENTICULAR LENS ELEMENT. AUG. 10, 1976.
3,973,958.—IMAGING METHOD INCLUDING EXPOSURE OF DEFORMATION IMAGING MEMBER THROUGH LENTICULAR ELEMENT. AUG. 10, 1976.
4,003,649.—ELECTROPHOTOGRAPHIC HALFTONE PRINTING MACHINE EMPLOYING A PHASE SCREEN. JAN. 18, 1977.
4,007,981.—DUAL MODE ELECTROSTATOGRAPHIC PRINTING MACHINE. FEB. 15, 1977.

4,012,137.—AN OPTICAL SYSTEM HAVING A ROTATING SCREEN. MAR. 15, 1977.
4,013,355.—NOTCH FILTER FOR COLOR TRANSPARENCY COPYING MACHINES. MAR. 22, 1977.
4,014,030.—HALF-TONE IMAGING WITH FLYING SPOT SCANNER SYSTEM. MAR. 22, 1977.
4,014,607.—REMOVABLE SCREENING SYSTEM FOR A TRANSPARENCY REPRODUCTION MACHINE. MAR. 29, 1977.
4,025,181.—A SCREEN CLEANING DEVICE. MAY 24, 1977.
4,035,070.—APPARATUS AND METHOD FOR OPTICAL GENERATION OF A STRUCTURED CHARGE-DISCHARGE PATTERN ON A PHOTO. JULY 12, 1977.
4,047,810.—DUAL MODE COPYING MACHINE. SEPT. 13, 1977.
4,072,414.—SCREEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. FEB. 7, 1978.
4,080,055.—A HALF-TONE COLOR COPIER. MAR. 21, 1978.
4,083,632.—MULTI FREQUENCY SCREEN. APR. 11, 1978.
4,090,786.—MULTI-COLOR SCREEN FOR ELECTROPHOTOGRAPHIC PRINTING. MAY 23, 1978.
4,095,889.—EXPOSURE SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 20, 1978.
4,108,654.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A DOCUMENT SCREEN. AUG. 22, 1978. FRA. 7514227. GRB. 1490898.
4,111,542.—COLLATING SYSTEM FOR OPAQUE DOCUMENTS AND SLIDE REPRODUCTIONS. SEPT. 5, 1978.
4,130,841.—VARIABLE FREQUENCY HALF-TONE IMAGING APPARATUS. DEC. 19, 1978.

Class 4B 1A 4

3,424,525.—MICROFILM COPIER ATTACHMENT. JAN. 28, 1969.
3,542,468.—MICROFILM ENLARGER-COPIER - MICROFILM ATTACHMENT. NOV. 24, 1970. CAN. 0858250.
3,547,533.—MICROFILM REPRODUCTION MACHINE. DEC. 15, 1970. BEL. 0689227, CAN. 0891072, FRA. 1498788, GRB. 1160904, ITL. 0794772, MEX. 0095144.
4,046,473.—PHOTORECEPTOR METHOD AND SYSTEM. SEPT. 6, 1977.

Class 4B 2

3,220,324.—PHOTOCONDUCTIVELY CONTROLLED CORONA CHARGING. NOV. 30, 1965. CAN. 0710976, GER. 1243967, GRB. 1034009, JAP. 0651092.
3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.
3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.
3,394,002.—CHARGE TRANSFER WITH LIQUID LAYERS. JULY 23, 1968. CAN. 0840028, GRB. 1126048, JAP. 0524527.
3,698,807.—DISPLAYING AND PRINTING APPARATUS. OCT. 17, 1972. CAN. 0963521, GRB. 1376814.

Class 4B 3

3,283,651.—INFORMATION ENCODING DEVICE. NOV. 8, 1966. CAN. 0859923, GRB. 1096645, JAP. 0547197.
3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.
3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.
3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.
3,725,059.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC SURFACE. APR. 3, 1973. GRB. 1337282.
3,862,801.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC IMAGING SURFACE. JAN. 28, 1975. GRB. 1337282.
4,066,353.—HALF TONE IMAGING SYSTEM. JAN. 3, 1978.
4,068,940.—VARIABLE CONTRAST OPTICAL SCREENING SYSTEM. JAN. 17, 1978.

Class 4B 4

3,283,651.—INFORMATION ENCODING DEVICE. NOV. 8, 1966. CAN. 0859923, GRB. 1096645, JAP. 0547197.
3,432,231.—EXPOSURE CONTROL DEVICE. MAR. 11, 1969.
3,473,455.—EXPOSURE REGISTRATION APPARATUS. OCT. 21, 1969.
3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 68/2518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.
3,586,849.—ILLUMINATION SYSTEM. JUNE 22, 1971. ARG. 0183139, ATR. 0303522, AUS. 0428629, BEL. 0733400, BRA. 6908480, CAN. 0903730, CHL. 0024870, FRA. 6917011, GRB. 1260688, ITL. 0864185, MEX. 0111515, NOR. 0125954, NZL. 0156507, PNM. 0001430, PRU. 0010320, PTG. 0051752, SAF. 0693689, SPN. 0367616, STZ. 0758269, SWD. 0354924, VZL. 0025067.
3,697,160.—CONTINUOUS IMAGING APPARATUS. OCT. 10, 1972.
3,995,950.—EXPOSURE SYSTEM FOR ELECTROSTATIC MACHINES. DEC. 7, 1976.
4,111,541.—EXPOSURE SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINES. SEPT. 5, 1978.

Class 4B 5

3,212,417.—REFLEX EXPOSURE SYSTEM. OCT. 19, 1965. CAN. 0733682, GRB. 1052783, JAP. 0487026.
3,278,302.—PHOSPHORESCENT SCREEN REFLEX. OCT. 11, 1966. CAN. 0748828.

Class 4B 6

3,355,236.—AUTOMATIC OPTICAL CONTROL APPARATUS. NOV. 28, 1967. CAN. 0771917.
3,542,467.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 24, 1970. ARG. 0180116, AUS. 0442029, BEL. 0731552, BRA. 6908056, CAN. 0877451, FRA. 6911558, GRB. 1257103, ITL. 0857659, JAP. 0668806, MEX. 0108892, SPN. 0366056, SWD. 0346397, VZL. 0023746.
3,765,027.—ION LENS RECORDING SYSTEM. OCT. 9, 1973.
3,848,996.—PHOTOCOMPOSING APPARATUS. NOV. 19, 1974. BEL. 0815043.
3,901,585.—ZOOM LENS ASSEMBLY. AUG. 26, 1975. GRB. 1443481.
3,909,103.—LENS SCAN MECHANISM. SEPT. 30, 1975.
3,947,188.—VARIABLE CONJUGATE OPTICAL SYSTEM. MAR. 30, 1976.
3,967,896.—VARIABLE EDGE FADEOUT APP FOR ELECTROSTATIC REPRODUCTION MACHINE. JULY 6, 1976.
3,998,540.—REPOSITIONING SYSTEM FOR VIEWING AND PROJECTION ELEMENTS OF A REPRODUCING APPARATUS. DEC. 21, 1976.
4,013,361.—OPTICAL APP AND REPRODUCING MACHINE. MAR. 22, 1977. BEL. 0843158.
4,027,963.—MULTI-MODE REPRODUCING APPARATUS. JUNE 7, 1977. BEL. 0843154, HAT. 0001534.
4,029,411.—VARIABLE MAGNIFICATION COPIER. JUNE 14, 1977. BEL. 0839792, SPN. 0445641.
4,033,691.—VARIABLE MAGNIFICATION REPRODUCING APPARATUS. JULY 5, 1977.
4,033,692.—MULTI-MODE REPRODUCING MACHINE. JULY 5, 1977. HAT. 0001504.
4,046,467.—ZOOM LENS COPIER. SEPT. 6, 1977.
4,053,221.—MULTI-MODE REPRODUCING APPARATUS. OCT. 11, 1977.
4,060,324.—LENS SWITCHING MECHANISM FOR USE IN COPYING MACHINE. NOV. 29, 1977.
4,076,388.—ZOOM LENS ASSEMBLY. FEB. 28, 1978. GRB. 1443481.
4,076,416.—ILLUMINATION SLIT FOR AND A PROCESS OF USE THEREOF IN A REPRODUCING MACHINE. FEB. 28, 1978. HAT. 1584.
4,076,417.—INTERLOCKING APPARATUS FOR AN OPTICAL SYSTEM AND REPRODUCING MACHINE. FEB. 28, 1978. HAT. 1604.
4,101,213.—ZOOM LENS COPIER. JULY 18, 1978.

Class 4B 6A

3,318,186.—OPTICAL SYSTEM FOR REPRODUCTION MACHINES. MAY 9, 1967. CAN. 0798056, FRA. 1467332, GRB. 1139231, ITL. 0758313, JAP. 0512656, MEX. 0085288, SWD. 6912062.
3,454,335.—SCANNING SYSTEM. JULY 8, 1969. BEL. 0708647, CAN. 0853453, FRA. 1549127, GRB. 1207850, ITL. 0819656, JAP. 0591210.

3,476,478.—APPARATUS FOR CHANGING MAGNIFICATION OF PHOTOCOPIER W/O CHANGING CONJUGATE LENGTH OF OPTICAL SY. NOV. 4, 1969. ARG. 0172460, AUS. 0415808, BEL. 0708650, BRA. 6795668, CAN. 0845405, FRA. 1552364, GER. 1297981, GRB. 1223427, ITL. 0821929, MEX. 0100019, VZL. 0023689.

3,510,219.—OPTICAL ALIGNMENT SYSTEM. MAY 5, 1970. ARG. 0172455, BRA. 6793791, CAN. 0881018, CHL. 0023570, GRB. 1206966, MEX. 0101166, PRU. 0009329, SPN. 0360896, STZ. 0501233, SWD. 0359168, URG. 0008831, VZL. 0025783.

3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 68/2518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.

3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.

3,591,256.—VARIABLE MAGNIFICATION LENS SYSTEM. JULY 6, 1971. BEL. 0731553, CAN. 0881019, FRA. 6911559, GRB. 1234515, ITL. 0857660.

3,591,277.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 6, 1971. AUS. 0428584, BEL. 0723949, CAN. 0869628, CZC. 0157052, FRA. 1591801, GER. 0989774, GRB. 1223429, ITL. 0856815, SWD. 0348060, USR. 0465805.

3,600,066.—OPTICAL ASSEMBLY WITH SUPPLEMENTAL LENS MEANS. AUG. 17, 1971. CAN. 0943792, GRB. 1261159, JAP. 0728824.

3,817,599.—PROJECTION LENS WITH ADD LENS ELEMENTS. JUNE 18, 1974.

3,912,374.—SIX COMPONENT ZOOM LENS. OCT. 14, 1975.

4,047,811.—AVAILABLE LIGHT MARGINAL ILLUMINATION SYSTEM. SEPT. 13, 1977.

4,056,308.—VARIABLE FOCAL LENGTH REFLECTOR LENS SYSTEM. NOV. 1, 1977.

4,057,342.—ILLUMINATION SLIT FOR A REPRODUCING MACHINE. NOV. 8, 1977.

4,061,419.—VARIABLE MAGNIFICATION LENS SYSTEM. DEC. 6, 1977.

4,076,389.—ZOOM LENS MOUNT AND MECHANISM. FEB. 28, 1978.

Class 4B 7

3,470,797.—DISPLAY DEVICE. OCT. 7, 1969.

3,472,136.—CHARACTER GENERATOR. OCT. 14, 1969. CAN. 0884500, GRB. 1191881.

3,473,455.—EXPOSURE REGISTRATION APPARATUS. OCT. 21, 1969.

3,523,725.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 11, 1970. CAN. 0917730, GRB. 1271862.

3,615,132.—METHOD OF PRINTING MULTIPLE COPIES OF COMPOSITE INFORMATION ON STANDARD SIZE COPY SHEETS. OCT. 26, 1971.

3,620,618.—MULTIPLE INPUT COPYING APPARATUS. NOV. 16, 1971.

3,775,007.—FORMS REPRODUCTION APPARATUS. NOV. 27, 1973.

3,827,062.—OPTICAL ARRANGEMENT FOR HIGH SPEED PRINTOUT SYSTEM. JULY 30, 1974.

4,157,869.—TRANSPARENCY REPRODUCING MACHINE. JUNE 12, 1979.

Class 4C

3,188,208.—SPECTRAL CONTRAST CONTROL IN XEROGRAPHY. JUNE 8, 1965.

3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.

3,438,705.—AUTOMATIC XEROGRAPHIC DEVELOPMENT CONTROL. APR. 15, 1969. GRB. 1207830.

3,852,782.—IMAGING SYSTEM. DEC. 3, 1974.

3,901,189.—MAGNETIC BRUSH DEVELOPING APPARATUS. AUG. 26, 1975.

3,917,393.—VARIOSLIT. NOV. 4, 1975. BEL. 0820132.

3,970,382.—A SPATIALLY SELECTIVE OPTICAL SYSTEM. JULY 20, 1976. FRA. 7421348.

3,975,289.—CHARGE TRANSFER COMPLEXE OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.

3,997,259.—APPARATUS FOR REDUCING IMAGE BACKGROUND IN ELECTROSTATIC REPRODUCTION MACHINES. DEC. 14, 1976.

4,007,326.—ELECTRONIC COPY ANALYSIS. FEB. 8, 1977.

4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.

4,066,351.—VARIABLE ILLUMINATION OPTICAL SYSTEM. JAN. 3, 1978.

4,118,122.—METHOD OF RENDERING OBJECTS UNCOPYABLE BY PHOTOCOPY PROCESSES. OCT. 3, 1978.

4,162,845.—COPIER FOR GREATER THAN STANDARD LENGTH DOCUMENTS. JULY 31, 1979.

Class 5

3,942,266.—METHOD AND APPARATUS FOR FIXING TONER IMAGES. MAR. 9, 1976.

4,043,052.—METHOD AND APPARATUS FOR FIXING TONER IMAGES. AUG. 23, 1977.

Class 5A 1

3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.

3,276,426.—CLOSED AEROSOL DEVELOPMENT. OCT. 4, 1966.

3,518,969.—DEVELOPMENT APPARATUS. JULY 7, 1970. CAN. 0852127, GRB. 1259879.

3,791,730.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGES. FEB. 12, 1974.

3,795,443.—XEROGRAPHIC DEVELOPMENT. MAR. 5, 1974. GRB. 1255568, JAP. 0721852.

4,096,826.—MAGNETIC BRUSH DEVELOPMENT SYSTEM FOR FLEXIBLE PHOTORECEPTORS. JUNE 27, 1978.

Class 5A 1A

3,129,113.—AUTOMATIC POWDER APPLICATOR APPARATUS. APR. 14, 1964.

3,640,246.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGE. FEB. 8, 1972. ATR. 0319044, AUS. 0457007, BEL. 0758632, CAN. 0917404, FRA. 7042231, GRB. 1336741, ITL. 0909113, JAP. 0815548, SPN. 0385187, STZ. 0527453, SWD. 0363411, USR. 0505386.

3,646,910.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGES. MAR. 7, 1972.

3,924,568.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 9, 1975. BEL. 0809747, GRB. 1434673.

3,974,796.—DUAL MODE APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. AUG. 17, 1976.

4,033,292.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. JULY 5, 1977.

Class 5A 2

3,160,524.—APPARATUS FOR CHARGING POWDER PARTICLES AND APPLYING THE CHARGED PARTICLES TO A RECEIVING MEMBER. DEC. 8, 1964. CAN. 0779861, GRB. 1026457.

3,257,223.—ELECTROSTATIC POWDER CLOUD XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. JUNE 21, 1966. CAN. 0756559, GRB. 1028900, JAP. 0460474.

3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.

3,357,403.—POWDER CLOUD DEVELOPMENT APPARATUS. DEC. 12, 1967.

3,470,009.—POWDER CLOUD DEVELOPMENT OF ELECTROSTATIC IMAGES. SEPT. 30, 1969. CAN. 0820240, FRA. 1461941, GRB. 1130452, HOL. 0142253, ITL. 0750148, JAP. 0512653, MEX. 0085176.

3,707,390.—METHOD FOR DEVELOPING ELECTROSTATIC LATENT IMAGES. DEC. 26, 1972.

3,767,446.—DEVELOPMENT METHOD WITH OSCILLATING BRUSH PAD. OCT. 23, 1973.

Class 5A 3

RE.28,183.—POWDER CLOUD. OCT. 1, 1974. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.

RE.28,193.—POWDER CLOUD XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 8, 1974. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.

3,129,850.—POWDER CLOUD GENERATING APPARATUS. APR. 21, 1964. CAN. 0693933, GER. 1497044, GRB. 1001237, JAP. 0436042.

3,648,901.—POWDER CLOUD XEROGRAPHIC DVLMNT APP-REISSUED AS 28183 AND 28193 10/74. MAR. 14,

1972. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.

3,799,113.—HYBRID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. MAR. 26, 1974. CAN. 0980634, GRB. 1411708.

4,057,340.—SINGLE COMPONENT COLOR DEVELOPMENT SYSTEM. NOV. 8, 1977.

Class 5A 3A

3,060,131.—POWDER CLOUD GENERATING APPARATUS. OCT. 23, 1962.

Class 5A 3B

3,599,604.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 17, 1971. ARG. 0187552, ATR. 0300574, AUS. 0427548, BEL. 0726572, BUL. 0017289, CAN. 0882577, DNK. 0122194, EGR. 0074431, EIR. 0032989, FRA. 1597322, GRB. 1248671, GRK. 0039920, IND. 0120485, ISR. 0031892, ITL. 0854007, LXB. 0058261, MEX. 0108936, NZL. 0155879, PAK. 0121035, PLP. 0006856, PNM. 0001804, PTG. 0051418, RHD. 1406967, RMN. 0054927, SAF. 0069181, SPN. 0362359, STZ. 0493015, UAR. 0009253, VTM. 0001857, VZL. 0023728.

3,633,544.—TURBO-CLOUD DEVELOPMENT. JAN. 11, 1972. CAN. 0934959, GRB. 1322363, JAP. 0741518.

3,670,701.—TWO STEP ORBITAL PAD DEVELOPMENT. JUNE 20, 1972. CAN. 0092849, GRB. 1313870, JAP. 0743834.

3,882,822.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE. MAY 13, 1975.

Class 5A 5

3,345,293.—COLORED ELECTROSTATOGRAPHIC TONERS CONTAINING ORGANIC DYE PIGMENTS. CAN. 0834674, GRB. 107147, JAP. 0788652.

3,483,679.—FILTER APPARATUS. DEC. 16, 1969. BEL. 0708648, CAN. 0853503, FRA. 1552363, ITL. 0837050.

3,697,263.—METHOD OF CLEANING RESIDUAL LIQUID DEVELOPER FROM ELECTROPHOTOGRAPHIC PLATES. OCT. 10, 1972. ARG. 0181940, AUS. 0455091, BEL. 0758060, CAN. 0906334, EGR. 0087483, FRA. 7041623, GRB. 1328406, ITL. 0916264, JAP. 0749381, MEX. 0116862, SPN. 0385000, STZ. 0519186, SWD. 0365624, TIW. 0006850, USR. 0349206, VZL. 0032211.

3,924,568.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 9, 1975. BEL. 0809747, FRA. 7401161, GRB. 1434673, ITL. 1003370.

3,937,570.—CLOUD SUPPRESSION IN AN ELECTROSTATIC COPYING APPARATUS. FEB. 10, 1976. CAN. 0974751, GRB. 1396922.

Class 5B

3,103,445.—METHOD OF DEVELOPING AN ELECTROSTATIC LATENT IMAGE ON A XEROGRAPHIC PLATE. SEPT. 10, 1963, GRB. CAN. 0705363, GRB. 0956358.

3,251,706.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. MAY 17, 1966. CAN. 0629542, FRA. 1120534, GER. 1020234, GRB. 0774433.

3,357,402.—ROTARY BRUSH DEVELOPMENT. DEC. 12, 1967. ARG. 0167329, ATR. 0279354, AUS. 0416581, BEL. 0708497, BRA. 0088306, CAN. 0859029, FRA. 1548189, GER. 1597901, GRB. 1200068, HUN. 0156541, ITL. 0819626, JAP. 0608703, MEX. 0106260, PLD. 0071357, SPN. 0348633, SWD. 0328190, VZL. 0023686.

3,542,466.—DEVELOPMENT APPARATUS. NOV. 24, 1970. AUS. 0428620, BEL. 0725611, CAN. 0884213, FRA. 1598505, GRB. 1203167, ITL. 0870661, JAP. 0641479, SPN. 0361653, SWD. 0343694.

3,558,339.—METHOD OF AND APPARATUS FOR STIPPLING. JAN. 26, 1971. CAN. 0871649, GRB. 1266969.

3,574,301.—DEVELOPING APPARATUS. APR. 13, 1971. AUS. 0449350, BEL. 0748073, CAN. 0873249, FRA. 7011549 GRB. 1303493, ITL. 0899146, JAP. 0715126, STZ. 0518579, SWD. 0356379, USR. 0331581.

3,592,167.—APPARATUS FOR LOADING TONER ON A DEVELOPING BRUSH. JULY 13, 1971.

3,613,638.—MATERIALS FOR FIBROUS DEVELOPMENT. OCT. 19, 1971. CAN. 0910736.

3,632,370.—MULTIPLE BRUSH DEVELOPMENT. JAN. 4, 1972.

3,636,924.—FUR BRUSH DEVELOPING APPARATUS. JAN. 25, 1972. CAN. 0912811, GRB. 1340060, JAP. 0751882.

3,638,613.—TONER DEVELOPER SYSTEM. FEB. 1, 1972. AUS. 0445403, BEL. 0747124, CAN. 0889762, EGR. 0081783, FRA. 7007651, GRB. 1294603, ITL. 0898243, SPN. 0377302, STZ. 0520960, SWD. 0354363, TIW. 0006827.

3,687,106.—DONOR APPARATUS AND METHOD. AUG. 29, 1972. ARG. 0185079, BEL. 0753207, CAN. 0911706, FRA. 7027124, GRB. 1314862, ITL. 0900444, JAP. 0733285, MEX. 0117318, PNM. 0002237, VZL. 0027517.

3,692,402.—MATERIALS FOR FIBROUS DEVELOPMENT AND CLEANING MEMBER. SEPT. 19, 1972.

3,847,306.—DEVELOPING APPARATUS. NOV. 12, 1974. CAN. 0966998, GRB. 1353651.

Class 5C

3,648,657.—ELECTROSTATIC IMAGE DEVELOPMENT APPARATUS. MAR. 14, 1972.

3,805,739.—CONTROLLING MULTIPLE VOLTAGE LEVELS FOR ELECTROSTATIC PRINTING. APR. 23, 1974. CAN. 0972552, GRB. 1382710.

3,854,449.—DEVELOPMENT APPARATUS. DEC. 17, 1974. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, SPN. 0414805, STZ. 0551030, SWD. 7307101, VZL. 0032067.

3,967,892.—A DEVELOPMENT SYSTEM. JULY 6, 1976.

3,981,272.—MAG BRUSH HOUSING WITH DETACHABLE SUMP SECTION. BEL. 0835755. SEPT. 21, 1976.

3,998,537.—SPLIT DEVELOPER HOUSING WITH INTERLOCKED FLOW GATE & CATCH. DEC. 21, 1976. BEL. 0835370.

4,027,621.—DEVELOPING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINES. JUNE 7, 1977.

4,039,102.—DEVELOPER DOOR WITH USE COUNTER ON DOOR. AUG. 2, 1977.

4,095,883.—MAGNETIC MIXING APPARATUS AND PROCESS. JUNE 20, 1978.

4,118,115.—ROLL DEVELOPER DRIVE. OCT. 3, 1978.

4,146,323.—AUGER FOR A DEVELOPMENT SYSTEM. MAR. 27, 1979.

Class 5C 1

3,113,042.—XEROGRAPHIC APPARATUS WITH MAGNETIC CONVEYOR. DEC. 3, 1963. CAN. 0738917, GRB. 0987985.

3,176,652.—XEROGRAPHIC DEVELOPING APPARATUS. APR. 6, 1965. CAN. 0737851, GRB. 1018787, JAP. 0627140.

3,570,453.—DEVELOPMENT APPARATUS. MAR. 16, 1971. ARG. 0181813, AUS. 0429322, BEL. 0737102, CAN. 0885918, CZC. 0161861, EGR. 0081317, FRA. 6927184, GRB. 1256282, ITL. 0869726, JAP. 0716364, SPN. 0370289, STZ. 0496263, SWD. 0353165, TIW. 0005357, USR. 0380031.

3,572,288.—DEVELOPMENT APPARATUS. MAR. 23, 1971. CAN. 0885917.

3,572,289.—MAGNETIC BRUSH DEVELOPMENT APPARATUS. MAR. 3, 1971.

3,575,139.—ELECTROSTATIC MAGNETIC DEVELOPER UNIT GATING APPARATUS. APR. 20, 1971. CAN. 0930538.

3,583,364.—DEVELOPMENT APPARATUS. JUNE 8, 1971. BEL. 0738574, CAN. 0883725, FRA. 6930427, GRB. 1273187, ITL. 0871550, JAP. 0674394.

3,608,522.—XEROGRAPHIC DEVELOPMENT CONTROL APPARATUS. SEPT. 28, 1971. CAN. 0911704.

3,640,248.—ELECTROSTATIC MAGNETIC DEVELOPING APPARATUS—MULTIPLE MAGNETIC BRUSH UNIT. FEB. 8, 1972. ARG. 0184080, ATR. 0312419, AUS. 0437486, BEL. 0751486, BRA. 0088030, CAN. 0929337, CHL. 0026193, EGR. 0084331, FRA. 7020260, GRB. 1251477, ITL. 0893838, MEX. 0117951, NOR. 0133049, PNM. 0002537, SAF. 0703774, SPN. 0380378, STZ. 0509614, SWD. 0359664, TIW. 0007168, USR. 0419061, VZL. 0025834.

3,641,980.—DEVELOPMENT APPARATUS. FEB. 15, 1972. ARG. 0185081, AUS. 0445430, BEL. 0757698, CAN. 0913354, EGR. 0085713, FRA. 7038237, GRB. 1273456, ITL. 0909031, JAP. 0720627, MEX. 0118187, SPN. 0384576, STZ. 0516183, SWD. 0362510, TIW. 0006205.

3,665,891.—MAGNETIC BRUSH DEVELOPMENT APPARATUS. MAY 30, 1972. CAN. 0914904, GRB. 1347138, JAP. 783770.

3,683,406.—MAGNETIC INCREMENTAL CASCADE DEVELOPMENT SYSTEM. AUG. 8, 1972. CAN. 0945200, GRB. 1335995, JAP. 0752521.

3,690,912.—METHOD FOR MAGNETIC DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE. SEPT. 12, 1972.

3,697,050.—CROSS MIXING BAFFLE. OCT. 10, 1972. CAN. 0951110.

3,709,713.—METHOD FOR MAGNETIC DEVELOPMENT. JAN. 9, 1973.

3,724,422.—MAGNETIC BRUSH DEVELOPING APPARATUS. APR. 3, 1973. ARG. 0190744, AUS. 0457858, BEL. 0776598, CAN. 0951111, EGR. 0097962, FRA. 7145341, GRB. 1373010, ITL. 0943877, MEX. 0124647, SPN. 0397854, SWD. 0365880, USR. 0459904.

3,788,275.—MAGNETIC SHIELDING APPARATUS. JAN. 29, 1974. BEL. 0801242, CAN. 0973703, GRB. 1438332, ITL. 0990692.

3,828,728.—XEROGRAPHIC DEVELOPMENT SYSTEM. AUG. 13, 1974. BEL. 0791193, CAN. 0980635, FRA. 7240058, GRB. 1413337, ITL. 0970350, SWD. 7214311.

3,866,564.—MAGNETIC BRUSH DEVELOPING APPARATUS FOR COPIERS. FEB. 18, 1975.

3,872,830.—MAGNETIC BRUSH DEVELOPING APPARATUS. MAR. 25, 1975.

3,880,517.—REPRODUCTION MACHINE DEVELOPER APPARATUS. APR. 29, 1975.

3,880,518.—FLOATING DEVELOPER PLATEN FOR REPRODUCTION APPARATUS. APR. 29, 1975.

3,887,367.—METHOD FOR TEMPERATURE STABLIZING PHOTORECEPTORS. JUNE 3, 1975.

3,893,815.—MAGNETIC BRUSH SUPPORT MEMBER. JULY 8, 1975.

3,906,121.—ELECTROSTATIC DEVELOPMENT METHOD USING MAGNETIC BUSH CONFIGURATION TRANSPORT. SEPT. 16, 1975. CAN. 0970631, GRB. 1381049.

3,906,898.—MAGNETIC BRUSH DEVELOPING APPARATUS. SEPT. 23, 1975.

3,911,864.—TONER PRELOADED MAGNETIC BRUSH DEVELOPMENT SYSTEM. OCT. 14, 1975. BEL. 0809859, STZ. 0568594.

3,915,121.—DEVELOPMENT APPARATUS. OCT. 28, 1975.

3,920,329.—BACKGROUND REMOVAL APPARATUS. NOV. 18, 1975.

3,921,577.—MAGNETIC DEVELOPMENT UNIT. NOV. 25, 1975.

3,926,516.—DEVELOPMENT APPARATUS FOR AN ELECTROSTATOGRAPHIC PRINTING MACHINE. DEC. 16, 1975.

3,927,640.—DEVELOPER SHUT-OFF APPARATUS. DEC. 23, 1975.

3,934,549.—TRANSFER APPARATUS. JAN. 27, 1976.

3,945,342.—MAGNETIC BRUSH SUPPORT MEMBER. MAR. 23, 1976.

3,948,217.—MAGNETIC BRUSH DEVELOPMENT SYSTEM WITH FLOATING DEVELOPMENT ROLLS. APR. 6, 1976. BEL. 0835370.

3,949,704.—MAGNETIC BRUSH DEVELOPING APPARATUS. APR. 13, 1976.

3,950,089.—COATED ROLL FOR MAGNETIC BRUSH DEVELOPMENT & CLEANING SYSTEMS. APR. 13, 1976.

3,953,121.—ARTICULATED DEVELOPMENT APPARATUS. APR. 27, 1976. IRN. 0013434.

3,962,003.—METHOD OF FORMING MAGNETIC BRUSH SUPPORT MEMBER. JUNE 8, 1976.

3,968,773. JULY 13, 1976.

3,982,498.—DEVELOPMENT APPARATUS. SEPT. 28, 1976. FRA. 7436713.

3,991,713.—DEVELOPMENT APPARATUS FOR AN ELECTROSTATOGRAPHIC PRINTING MACHINE. NOV. 16, 1976.

3,996,892.—SPATIALLY PROGRAMMABLE ELECTRODE TYPE ROLL FOR ELECTROSTATOGRAPHIC PROCESSORS AND THE LIKE. DEC. 14, 1976.

4,033,293.—A DEVELOPING DEVICE OF AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 5, 1977.

4,033,294.—DEVELOPER MIXING AND TRANSPORTING AUGER FOR MAGNETIC BRUSH DEVELOPING APPARATUS. JULY 5, 1977.

4,034,709.—AN IMPROVED DEVELOPER ROLL. JULY 12, 1977.

4,044,719.—DEVELOPING APPARATUS IN ELECTROCOPYING MACHINES. AUG. 30, 1977.

4,050,413.—MAGNETIC BRUSH CROSSMIXING SYSTEM. SEPT. 27, 1977.

4,057,666.—MAGNETIC BRUSH DEVELOPER ROLL FOR ELECTROSTATIC REPRODUCTION MACHINES. NOV. 8, 1977.

4,077,358.—DEACTIVATING DEVICE FOR A MAGNETIC BRUSH DEVELOPER USED IN A MULTICOLOR ELECTROPHOTOGRAPHIC. MAR. 7, 1978.

4,078,520.—VIBRATING SCREEN FILTER FOR TONER DENSITY MEASURING APPARATUS. MAR. 14, 1978.

4,084,542.—POSITIONING APPARATUS FOR MAGNETIC BRUSH DEVELOPING DEVICE. APR. 18, 1978.

4,086,006.—PURGING SYSTEM FOR A DEVELOPMENT APPARATUS. APR. 25, 1978.

4,096,826.—MAGNETIC BRUSH DEVELOPMENT SYSTEM FOR FLEXIBLE PHOTORECEPTORS. JUNE 27, 1978.

4,098,228.—HIGH SPEED MAGNETIC BRUSH DEVELOPMENT SYSTEM. JULY 4, 1978.

4,116,555.—BACKGROUND REMOVAL APPARATUS. SEPT. 26, 1978.

4,117,803.—DEVELOPER FLOW REGULATOR FOR A MAGNETIC BRUSH DEVELOPING DEVICE. OCT. 3, 1978.

4,118,115.—ROLL DEVELOPER DRIVE. OCT. 3, 1978.

4,127,327.—APPARATUSES INCORPORATING A COMPOSITE SUPPORT MEMBER. NOV. 28, 1978.

4,131,357.—SEQUENTIALLY ACTIVATED DEVELOPMENT SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTER. DEC. 26, 1978.

4,155,329.—MAGNETIC BRUSH DEVELOPING DEVICE. MAY 22, 1979.

Class 5C 1A

3,584,601.—MAGNETIC BRUSH BELT DEVELOPMENT. JUNE 15, 1971. CAN. 0884799, GRB. 1238277.

3,592,166.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES. JULY 13, 1971. CAN. 0887598, GRB. 1275822, JAP. 1162298.

3,638,614.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT APPARATUS. FEB. 1, 1972. CAN. 0929338, GRB. 1304236, JAP. 0808219.

3,741,790.—METHOD FOR MAGNETICALLY DEVELOPING ELECTROSTATIC IMAGES. JUNE 26, 1973.

3,823,688.—MAGNETIC BRUSH ASSEMBLY. JULY 16, 1974. BEL. 0794507, CAN. 0989607, FRA. 7302247, GRB. 1394502, SWD. 7301014.

3,965,862.—XEROGRAPHIC DEVELOPMENT SYSTEM. JUNE 29, 1976.

Class 5C 1B

3,532,071.—DEVELOPMENT APPARATUS. OCT. 6, 1970. CAN. 0883763, GRB. 1227549, JAP. 0650630.

3,552,355.—DEVELOPMENT APPARATUS. JAN. 5, 1971. ARG. 0175330, ATR. 0300575, AUS. 0441519, BEL. 0730371, CAN. 0914005, CZC. 0161850, DNK. 0129880, EGR. 0077412, EIR. 0032786, FRA. 6909741, GRB. 1263566, GRK. 0039919, IND. 0120212, ISR. 0031757, ITL. 0860255, LXB. 0058295, MEX. 0111374, NOR. 0128037, NZL. 0155695, PAK. 0120989, PLD. 0017651, PLP. 0006606, PNM. 0001723, PTG. 0051392, RHD. 1156947, SAF. 0691728, SPN. 0365439, STZ. 0499140, SWD. 0341530, TIW. 0006602, UAR. 0009242, USR. 0383338, VTM. 0001829, VZL. 0023745.

3,645,770.—METHOD FOR DEVELOPING XEROGRAPHIC IMAGES. FEB. 29, 1972.

3,893,414.—METHOD AND APP FOR VARYING DEVELOPER BANDWIDTH. JULY 8, 1975.

3,908,596.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. SEPT. 30, 1975.

3,930,466.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. JAN. 6, 1976.

3,990,393.—APPARATUS FOR DEPOSITING MAGNETIC MATERIAL ON AN IMAGE BEARING MEMBER. NOV. 9, 1976.

3,998,184.—A DEVELOPMENT APPARATUS. DEC. 21, 1976.

4,025,179.—PASSIVE CROSS MIXING SYSTEM. MAY 24, 1977.

Class 5C 2

3,508,823.—DUPLICATING APPARATUS. APR. 28, 1970.

3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.

3,941,280.—APPARATUS FOR CONTROLLING DEVELOPER EFFICIENCY. MAR. 2, 1976.

3,965,862.—XEROGRAPHIC DEVELOPMENT SYSTEM. JUNE 29, 1976.

4,053,218.—DEVELOPMENT SYSTEM. OCT. 11, 1977.

4,082,061.—MULTI-COLOR DEVELOPMENT SYSTEM. APR. 4, 1978.

4,087,168.—CHARGING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. MAY 2, 1978.

4,131,357.—SEQUENTIALLY ACTIVATED DEVELOPMENT SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTER. DEC. 26, 1978.

Class 5C 3

3,906,897.—DEVELOPMENT APPARATUS. SEPT. 23, 1975. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, SPN. 0414905, STZ. 0551030, SWD. 7307101, VZL. 0032067.

3,940,272.—METHOD OF DEVELOPING AN ELECTROSTATIC LATENT IMAGE. FEB. 24, 1976. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, SPN. 0414905, STZ. 0551030, SWD. 7307101, VZL. 0032067.
4,102,305.—DEVELOPMENT SYSTEM WITH ELECTRICAL FIELD GENERATING MEANS. JULY 25, 1978.
4,150,173.—PROCESS OF PREPARING TRANSPARENT COLORED MAGNETIC MATERIALS. MAY 17, 1979.
4,199,614.—TRANSPARENT COLORED MAGNETIC MATERIALS AND ELECTROSTATOGRAPHIC PROCESS. APR. 22, 1980.

Class 5D

3,768,904.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. OCT. 30, 1973.
3,793,985.—IMAGING SYSTEM. FEB. 26, 1974.
3,924,944.—SPLIT DEVELOPER HOUSING. DEC. 9, 1975.
4,015,561.—ANTI-GRAVITATIONAL CASCADE DEVELOPMENT FOR ELECTROSTATIC PROCESSOR. APR. 5, 1977.
4,095,883.—MAGNETIC MIXING APPARATUS AND PROCESS. JUNE 20, 1978.

Class 5D 1

3,219,014.—MECHANICAL SHIELD TO PROTECT MAGNETIC CORE IN XEROGRAPHIC DEVELOPING APPARATUS. NOV. 23, 1965. CAN. 0757573, FRA. 1393298, GER. 1497076, GRB. 1034099, ITL. 0710188, JAP. 0477812.
3,685,488.—XEROGRAPHIC DEVELOPMENT. AUG. 22, 1972.
3,884,571.—LEAKAGE DEVELOPER RECIRCULATION. MAY 20, 1975. HOL. 3884571.
3,999,512.—ELECTROSTATIC DEVELOPMENT SYSTEM WITH PASSIVE STORAGE CAPACITY. DEC. 28, 1976. BEL. 0823656.
4,033,293.—A DEVELOPING DEVICE OF AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 5, 1977.

Class 5D 1A

3,067,720.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 11, 1962. ARG. 0175377, BEL. 0750689, PNM. 0002011, VZL. 0025828.
3,095,325.—TONER DISPENSER DRIVE MECHANISMS. JUNE 25, 1963.
3,190,264.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 22, 1965. CAN. 0733036.
3,303,817.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 14, 1967.
3,472,657.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. OCT. 14, 1969. AUS. 0418178, BEL. 0680374, CAN. 0813843, FRA. 1477370, GRB. 1141167, ITL. 0766858, JAP. 0537665, MEX. 0091119, SWD. 0330833.
3,593,838.—CONVEYOR BELT. JULY 20, 1971. CAN. 0883720.
3,635,553.—CASCADE DEVELOPING APPARATUS UTILIZING A ROTARY WHEEL WITH SCOOPS. JAN. 18, 1972.
3,649,262.—SIMULTANEOUS DEVELOPMENT-CLEANING OF SAME AREA OF AN ELECTROSTATOGRAPHIC IMAGE SUPPORT SURFACE. MAR. 14, 1972. AUS. 0445365, BEL. 0743661, CAN. 0916232, FRA. 6944511, GRB. 1296997, ITL. 0882670, USR. 0358873.
3,662,711.—DEVELOPMENT APPARATUS. MAY 16, 1972. CAN. 0945757, GRB. 1345253.
3,663,291.—CASCADE DEVELOPMENT. MAY 16, 1972.
3,678,896.—CONVEYOR SYSTEM. JULY 25, 1972. CAN. 0952465, GRB. 1325831.

Class 5D 1B

3,122,454.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 25, 1964.
3,435,803.—LIFTING APPARATUS. APR. 1, 1969. CAN. 0937394, FRA. 1511169, GER. 1456806, GRB. 1165378, ITL. 0788954, JAP. 0542586, MEX. 0095039.
3,448,724.—DEVELOPING APPARATUS. JUNE 10, 1969. ARG. 0174576, AUS. 0430081, BEL. 0726573, CAN. 0884214, CZC. 0157054, EGR. 0077413, FRA. 1598024, GRB. 1258781, ITL. 0854008, JAP. 0665972, MEX. 0107603, PNM. 0001429, RMN. 0054735, SAF. 0069179, SPN. 0362358, STZ. 0486057, SWD. 0338507, USR. 0410595, VZL. 0023716.
3,472,657.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. OCT. 14, 1969. AUS. 0418178, BEL. 0680374, CAN. 0813843, FRA. 1477370, GRB. 1141167, ITL. 0766858, JAP. 0537665, MEX. 0091119, SWD. 0330833.
3,606,533.—XEROGRAPHIC DEVELOPMENT. SEPT. 20, 1971.
3,661,118.—ELECTROSTATIC DEVELOPMENT. MAY 9, 1972. CAN. 0951107, GRB. 1359234.
3,695,224.—CASCADE DEVELOPMENT. OCT. 3, 1972.
3,835,811.—DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 17, 1974.
3,888,578.—DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 10, 1975.
3,900,255.—PADDLE-WHEEL DEVELOPMENT SYSTEM. AUG. 19, 1975.

Class 5D 1C

3,117,891.—XEROGRAPHIC APPARATUS. JAN. 14, 1964. CAN. 0740394, GRB. 1006078.
3,287,150.—CASCADE DEVELOPMENT PROCESS W/ TWO-COMPONENT DEVELOPER. NOV. 22, 1966.
3,415,224.—MAGNETIC CASCADE DEV APPARATUS. DEC. 10, 1968. AUS. 0423497, BEL. 0725943, CAN. 0852660, COR. 000948A, EGR. 0074432, FRA. 1603904, GRB. 1217281, ITL. 0849521, LXB. 0057873, MRC. 0014726, PTG. 0051108, SAF. 0688440, SPN. 0361840, STZ. 0493872, SWD. 0345753, SYA. 0002440, ZMB. 0166972.
3,667,427.—CASCADE APPARATUS. JUNE 6, 1972. CAN. 0951112, GRB. 1377152.
3,678,897.—DEVELOPER MIXING APPARATUS. JULY 25, 1972. BEL. 0778426, CAN. 0951113, FRA. 7203212, GRB. 1377151, ITL. 0946909.
3,741,372.—CONVEYOR FOR DEVELOPER APPARATUS. JUNE 26, 1973.

Class 5D 1D

3,550,555.—XEROGRAPHIC DEVELOPER SEPARATION. DEC. 29, 1970. CAN. 0855652, GRB. 1238032.

Class 5D 2

3,105,770.—CASCADE DEVELOPMENT IMPROVEMENT. OCT. 1, 1963. AUS. 0252867, BEL. 0749545, CAN. 0746453, FRA. 1286397, GER. 1278244, GRB. 0986844, ITL. 0648862, JAP. 0517396.
3,375,807.—XEROGRAPHIC DEVELOPER. APR. 2, 1968. CAN. 0819049, MEX. 0092092, VZL. 0024448.
3,542,579.—ELECTROSTATIC IMAGE DEVELOPMENT. NOV. 24, 1970.
3,973,517.—DEVELOPMENT DEVICE AND METHOD. AUG. 10, 1976.

Class 5D 3

3,336,905.—XEROGRAPHIC DEVELOPER APPARATUS. AUG. 22, 1967. CAN. 0793223, GRB. 1123059, JAP. 0508405.
3,428,025.—XEROGRAPHIC DEVELOPMENT APPARATUS-POWDER CLOUD BY CHARGE BREAKDOWN. DEC. 18, 1969.
3,638,610.—DEVELOPMENT APPARATUS. FEB. 1, 1972. CAN. 0916432, FRA. 7041622.
3,638,611.—ELECTRODED DEVELOPMENT DEVICE. FEB. 1, 1972. ARG. 0184658, ATR. 0308537, AUS. 0446323, BEL. 0752936, CAN. 0913893, CHL. 0025914, DNK. 0129305, EGR. 0084129, FRA. 7024067, GRB. 1258738, GUA. 0002615, IND. 0127311, ITL. 0900196, JAP. 0719143, MEX. 0115403, NOR. 0130134, NZL. 0160644, PLD. 0081287, PLP. 0006288, PNM. 0002266, PTG. 0054072, SAF. 0704532, SPN. 0381383, STZ. 0520961, SWD. 0359386, TIW. 0005923, USR. 0414818.
3,682,132.—AUTOMATIC DEVELOPER CONTROLLER. AUG. 8, 1972.

Class 5D 4

3,347,691.—XEROGRAPHIC DEVELOPMENT. OCT. 17, 1967. ARG. 0168482, CAN. 0827608, FRA. 1497061, GRB. 1166464, ITL. 0788454, JAP. 0589492, MEX. 0093822, VZL. 0032595.
3,412,710.—CLEAN UP ELECTRODE. NOV. 26, 1968. BEL. 0704923, CAN. 0867283, FRA. 1540699, GRB. 1196637, ITL. 0814605, JAP. 0585018.
3,620,191.—BIASED INPUT CHUTE. NOV. 16, 1971. ARG. 0199542, ATR. 0324837, AUS. 0446250, BEL. 0752943, CAN. 0918411, CHL. 0025871, DNK. 0128800, EGR. 0083704, FRA. 7024665, GRB. 1310444, GUA. 0002727, IND. 0127313, ITL. 0900192, JAP. 0731612, MEX. 0114979,

NOR. 0132115, NZL. 0160647, PLP. 0008638, PNM. 0002269, PTG. 0054075, SAF. 70/4534, SPN. 0381382, STZ. 0528761, SWD. 0359387, TIW. 0007164, USR. 0358874.

3,669,072.—DEVELOPER APPARATUS. JUNE 13, 1972. CAN. 0930539, GRB. 1343141.

3,682,538.—XEROGRAPHIC PICK-OFF PLATE. AUG. 8, 1972. ARG. 0186267, BEL. 0764562, CAN. 0935635, FRA. 7110750, GRB. 1349272, ITL. 0922348, MEX. 0119677, USR. 0426387.

3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.

3,795,222.—DEVELOPMENT ELECTRODE SYSTEM. MAR. 5, 1974.

3,807,997.—PLURAL ELECTRODE DEVELOPMENT METHODS FOR LATENT ELECTROSTATIC IMAGES. APR. 30, 1974. CAN. 0979299, GRB. 1381910.

3,808,026.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. APR. 30, 1974.

3,834,930.—METHOD OF DEVELOPING ELECTROSTATOGRAPHIC IMAGE. SEPT. 10, 1974.

3,907,695.—LIQUID DEVELOPER. SEPT. 23, 1975

4,197,211.—LIQUID ELECTROPHOTOGRAPHIC DEVELOPERS. APR. 8, 1980.

Class 5D 5

3,223,548.—XEROGRAPHIC DEVELOPING MACHINE AND METHOD. DEC. 14, 1965.

3,316,878.—CASCADE DEVELOPING APPARATUS. MAY 2, 1967.

Class 5E

3,357,399.—COMBINED FLUIDIZED BED AND INVERTED CASCADE DEVELOPMENT APPARATUS. DEC. 12, 1967. ARG. 0171121, CAN. 0821473, CHL. 0022944, MEX. 0096075, PRU. 0009332, URG. 0008548, VZL. 0021060.

3,677,633.—PORTABLE DOCUMENT ABSTRACTOR. JULY 18, 1972.

3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATINAIN. JUNE 12, 1973.

3,748,126.—MULTIPLE COPY SELECTIVE RE-WETTING PRINTING. JULY 24, 1973.

3,748,127.—TREATMENT OF REUSABLE PHOTOCONDUCTIVE SURFACES WITH LEWIS ACIDS OR BASES. JULY 24, 1973.

3,776,631.—LIQUID DEVELOPER CLEANING SYSTEM. DEC. 4, 1973.

3,865,611.—METHOD FOR ELECTROSTATIC IMAGE DEVELOPMENT EMPLOYING TONER AND CARRIER SUPPORTED BY CONDUCTIVE. FEB. 11, 1975.

3,893,854.—PHOTOGRAPHIC ARTICLES WITH GAPS FOR PROCESSING FLUIDS. JULY 8, 1975.

3,918,809.—APPARATUS FOR CLEANING A SURFACE SUPPORT. NOV. 11, 1975, GRB. 1438660.

3,927,934.—ELECTROSTATOGRAPHIC REPRODUCTION MACHINES. DEC. 23, 1975.

3,940,282.—BLADE CLEANING OF SURFACE WITH REVERSE MOVEMENT. FEB. 24, 1976.

3,951,653.—METHOD OF PREVENTING TONER BUILD-UP ON ELECTRODES DURING LIQUID DEVELOPMENT. APR. 20, 1976.

3,973,699.—LIQUID DISPENSING APPARATUS UTILIZING DOUBLE ACTING PISTON. AUG. 10, 1976, GRB. 1455885.

3,974,554.—QUANDRANGULAR TRIHETICORD GRAVURE ROLL. AUG. 17, 1976, BEL. 0841855.

3,978,817.—PATTERNED GRAVURE & DOCTORING MEANS THEREFOR. SEPT. 7, 1976. BEL. 0841855.

3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.

4,017,174.—DEVELOPER ASSEMBLY SUPPORT. APR. 12, 1977.

4,020,788.—DOCTORING MEANS. MAY 3, 1977.

4,023,900.—VARIABLE SPEED LIQUID DEVELOPMENT ELECTROSTATOGRAPHIC APPARATUS. MAY 17, 1977.

4,024,834.—TEMPERATURE COMPENSATED DOCTOR BLADE. MAY 24, 1977. GRB. 1430518.

4,037,952.—METHOD OF PREVENTING TONER BUILD-UP ON ELECTRODES DURING LIQUID DEVELOPMENT. JULY 26, 1977.

4,068,938.—ELECTROSTATIC COLOR PRINTING USING DISCRETE POTENTIALS. JAN. 17, 1978. GRB. 1442234.

4,126,711.—CHARGE PATTERN DEVELOPMENT METHOD & APPARATUS. NOV. 21, 1978. GRB. 1484712.

4,161,360.—LIQUID DEVELOPMENT APPARATUS. JULY 17, 1979.

4,210,080.—IMAGING METHOD AND APPARATUS. JULY 1, 1980.

Class 5E 2

3,730,708.—ELECTROPHOTOGRAPHIC MULTI-COLOR PROCESS EMPLOYING LIQUID DEVELOPER. MAY 1, 1973.

3,776,723.—LIQUID TRANSFER ELECTROPHOTOGRAPHIC DEVELOPMENT PROCESS. DEC. 4, 1973.

3,862,618.—LIQUID DEVELOPING APPARATUS DEVELOPING AN ELECTROSTATIC IMAGE. JAN. 28, 1975.

3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.

4,007,401.—ELECTROPHOTOGRAPHIC PRINTING METHOD. FEB. 8, 1977.

Class 5E 4

3,129,115.—XEROGRAPHIC DEVELOPING APPARATUS. APR. 14, 1964. GRB. 1008004.

3,251,688.—LIQUID TRANSFER DEVELOPMENT. MAY 17, 1966. CAN. 0765523, FRA. 1362253, GRB. 1032013.

3,270,637.—ELECTROVISCOUS RECORDING. SEPT. 6, 1966. AUS. 0403009, CAN. 0740112, FRA. 1414126, GER. 1497109, GRB. 1086197, HOL. 0141644, ITL. 0738077, JAP. 0508403, NOR. 0127882, STZ. 0472710, SWD. 0331032.

3,281,241.—METHOD OF FORMING A VISUAL RECORD OF A LATENT IMAGE RECEIVING WEB. OCT. 25, 1966. AUS. 0275028, CAN. 0766420, FRA. 1362254, GER. 1303008, GRB. 1035236, ITL. 0699412, JAP. 0470426.

3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.

3,334,613.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 8, 1967. CAN. 0787870, GRB. 1125628, JAP. 0546654.

3,369,918.—DEV OF LATENT ELECTROSTATIC IMGS W/ CREATED WAVES OF LIQUID DEVELOPER. FEB. 20, 1968.

3,576,623.—DEVELOPMENT SYSTEM EMPLOYING A CORONODE IMMERSED IN A LIQUID DEVELOPER. APR. 27, 1971. AUS. 0434437, CAN. 0872191, GER. 1908292, GRB. 1259880, JAP. 0675662.

3,577,259.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES UTILIZING A TONER-FREE ZONE. MAY 4, 1971.

3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971.

3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 0933997.

3,627,410.—REPRODUCTION APPARATUS WITH LIQUID. DEC. 14, 1971. CAN. 0886508.

3,627,557.—LIQUID DVLPMNT BY REDUCING VISCOSITY OF DVLPR ON ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971.

3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. ARG. 0181932, MEX. 0116451.

3,642,471.—LIQUID DEVELOPING PROCESS IN AN ELECTROSTATOGRAPHIC IMAGING SYSTEM. FEB. 15, 1972.

3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972.

3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.

3,656,948.—SELECTED REMOVAL OF LIQUID DVLPR IN CYCLICAL ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. CAN. 0906335, GRB. 1335054, JAP. 0760503.

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972.

3,672,884.—ELECTROSTATIC PRINTING. JUNE 27, 1972.

3,692,520.—DVLPNG ELCTRSTIC IMGS EMPLYNG FATTY ACD ESTRS INHBT DVLPR BUILD-UP. SEPT. 19, 1972. CAN. 0940361, GRB. 1332674.

3,784,397.—IMAGING SYSTEM. JAN. 8, 1974.

3,800,744.—ELECTROSTATIC LATENT IMAGE DEVELOPING APPARATUS. APR. 2, 1974.

3,804,510.—IMAGING DEVELOPING SYSTEM. APR. 16, 1974.

3,808,025.—LIQUID DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. APR. 30, 1974.

3,816,114.—ELECTRO-PHOTOGRAPHIC METHOD. JUNE 11, 1974.

3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974.

3,832,975.—ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 3, 1974.
3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974.
3,841,893.—CHARGE CONTROL AGENTS FOR LIQUID DEVELOPERS. OCT. 15, 1974.
3,849,171.—METHOD FOR CLEANING BACKGROUND AREAS FROM DEVELOPED RECORDING SURFACES. NOV. 19, 1974. CAN. 0941882.
3,862,619.—ELECTRO-PHOTOGRAPHIC APPARATUS. JAN. 28, 1975.
3,864,125.—ELECTROPHOTOGRAPHIC METHOD OF MAKING AN IMAGING MASTER. FEB. 4, 1975.
3,870,514.—LIQUID DEVELOPMENT FOR THE ELECTRONIC PHOTOGRAPHY. MAR. 11, 1975.
3,877,934.—INDUCTION IMAGING WITH IN-PLACE DEVELOPMENT. APR. 15, 1975.
3,890,040.—INDUCTION IMAGING APPARATUS. JUNE 17, 1975.
3,913,524.—LIQUID DEVELOPING APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 21, 1975.
3,926,825.—LIQUID DEVELOPER COMPOSITION AND PROCESS FOR PREPARING SAME. DEC. 16, 1975.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.
3,942,474.—DEVELOPING SYSTEMS. MAR. 9, 1976. ARG. 0181931, ATR. 0311971, AUS. 0457519, BEL. 0752802, CAN. 0904108, CHL. 0026275, EGR. 0084325, FRA. 7024068, GRB. 1320509, ITL. 0894828, JAP. 0815361, MEX. 0116454, SAF. 0704474, SPN. 0381297, STZ. 0513437, SWD. 0357269, TIW. 0006614, 0033335.
3,943,268.—LIQUID DEVELOPER PROCESS AND APP FOR ELECTROSTATOGRAPHY. MAR. 9, 1976. CAN. 0904683.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.
3,968,044.—MILLED LIQUID DEVELOPER. JULY 6, 1976.
3,970,043.—ELECTROPHOTOGRAPHIC DEVICE FOR LIQUID DEVELOPMENT. AUG. 20, 1976.
3,971,659.—COLOR ELECTROPHOTOGRAPHIC PROCESS USING PHOTO CONDUCTIVE PARTICLES IN LIQUID DEVELOPER. JULY 27, 1976.
3,972,305.—IMAGING SYSTEM. AUG. 3, 1976. CAN. 0904683.
3,976,808.—IMAGING SYSTEMS. AUG. 24, 1976.
3,986,968.—MILLED AND POLAR SOLVENT EXTRACTED LIQUID DEVELOPER. OCT. 19, 1976.
4,183,818.—COLOR ELECTROPHOTOGRAPHIC LIQUID DEVELOPER OF COLORED PARTICLES AND ZINC OXIDE. JAN. 15, 1980.

Class 5E 5

3,372,027.—XEROGRAPHIC LIQUID DEVELOPMENT. MAR. 5, 1968. CAN. 0800963, GRB. 1091169, ITL. 0760712, JAP. 0571175.
3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.
3,667,428.—DEVELOPING SYSTEMS. JUNE 6, 1972. ARG. 0195534, ATR. 0312420, AUS. 0456202, BEL. 0752805, CAN. 0904107, CHL. 0026274, CZC. 0164275, DNK. 0126528, EGR. 0083514, FRA. 7024066, GRB. 1320232, ITL. 0894827, JAP. 0745765, MEX. 0114978, PNM. 0002541, SAF. 0704475, SPN. 0194607, STZ. 0543753, SWD. 0366126, TIW. 0006616, USR. 0420196.
3,676,215.—IMAGING SYSTEM. JULY 11, 1972. ARG. 0182525, AUS. 0430692, BEL. 0732139, CAN. 0900770, FRA. 6913232, GRB. 1272306, ITL. 0857440, JAP. 0698292, MEX. 0109289, PNM. 0001433, SPN. 0386902, SWD. 0352117, USR. 0309549.
3,692,520.—DVLPNG ELCTRSTIC IMGS EMPLYNG FATTY ACD ESTRS INHBT DVLPR BUILD-UP. SEPT. 19, 1972. CAN. 0940361, GRB. 1332674.
3,712,728.—REVERSAL DEVELOPMENT. JAN. 23, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.
3,729,419.—LIQUID DEVELOPER. APR. 24, 1973.
3,772,012.—REVERSAL DEVELOPMENT USING POLAR LIQUID DEVELOPERS. NOV. 13, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.
3,776,723.—LIQUID TRANSFER ELECTROPHOTOGRAPHIC DEVELOPMENT PROCESS. DEC. 4, 1973.
3,795,530.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT. MAR. 5, 1974.
3,806,354.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES. APR. 23, 1974.
3,817,748.—CONTRAST CONTROL IN ELECTROSTATIC COPYING UTILIZING LIQUID DEVELOPMENT. JUNE 18, 1974. GRB. 1406794.
3,834,930.—METHOD OF DEVELOPING ELECTROSTATOGRAPHIC IMAGE. SEPT. 10, 1974.
3,856,519.—TRANSFER OF TONER USING A VOLATILE INSULATING LIQUID. DEC. 24, 1974.
3,900,405.—CASSETTE OPENING MECHANISM. AUG. 19, 1975. CAN. 0926460, GRB. 1362697.
3,907,694.—NON-VOLATILE CONDUCTIVE INKS. SEPT. 23, 1975.
3,907,695.—LIQUID DEVELOPER. SEPT. 23, 1975.
3,918,400.—BLADE MOUNTING ASSEMBLIES. NOV. 11, 1975. BEL. 0816534, FRA. 7421752, GRB. 1419417.
3,918,807.—CLEANING BLADE FOR PHOTOCOPIER. NOV. 11, 1975.
3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.
3,942,474.—DEVELOPING SYSTEMS. MAR. 9, 1976. ARG. 0181931, ATR. 0311971, AUS. 0457519, BEL. 0752802, CAN. 0904108, CHL. 0026275, EGR. 0084325, FRA. 7024068, GRB. 1320509, ITL. 0894828, JAP. 0815361, MEX. 0116454, SAF. 0704474, SPN. 0381297, STZ. 0513437, SWD. 0357269, TIW. 0006614, VZL. 0033335.
3,954,640.—ELECTROSTATIC PRINTING INKS. MAY 4, 1976. BEL. 0816553, GRB. 1452556.
3,978,817.—PATTERNED GRAVURE AND DOCTORING MEANS THEREFOR. SEPT. 7, 1976. BEL. 0841855.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.
3,985,663.—CONDUCTIVE INKS CONTAINING QUATERNARY AMMONIUM COMPOUNDS. OCT. 12, 1976.
3,993,023.—COATED FILAMENT WOUND INK APPLICATOR ROLL. NOV. 23, 1976.
3,993,024.—FILAMENT WOUND INK APPLICATOR ROLL. NOV. 23, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. NOV. 30, 1976. GRB. 1429517.
4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11, 1977. GRB. 1429517.
4,004,931.—CONSTANT VISCOSITY INKS. JAN. 25, 1977.
4,007,983.—IMPROVED LIQUID DEVELOPER CLEANING MEANS. FEB. 15, 1977.
4,017,174.—DEVELOPER ASSEMBLY SUPPORT. APR. 12, 1977.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. BEL. 0819537, GRB. 1429518.
4,024,292.—PROCESS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES WITH INK. MAY 17, 1977. BEL. 0816553, GRB. 1452556.
4,024,838.—DEVELOPER LIQUID SUPPLY DEVICE. MAY 24, 1977.
4,027,964.—IMAGING METHOD AND APPARATUS. JUNE 7, 1977. ARG. 0190535, BEL. 0777714, CAN. 0949825, FRA. 7201000, GRB. 1374501, ITL. 0946355, MEX. 0124981.
4,040,827.—DEVELOPMENT IMAGING METHODS. AUG. 9, 1977.
4,042,415.—METHOD FOR SCRAPING LIQUIDS FROM A MOVING SURFACE. AUG. 16, 1977.
4,043,657.—BLADE FOR METERING LIQUID DEVELOPER. AUG. 23, 1977. GRB. 1501464.
4,047,943.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES WITH CONDUCTIVE LIQUID DEVELOPER. SEPT. 13, 1977.
4,049,344.—ELECTROSTATIC IMAGING SYSTEM. SEPT. 20, 1977.
4,059,444.—LIQUID DEVELOPMENT USING CONDUCTIVE INKS. NOV. 22, 1977. GRB. 1495785.
4,089,683.—LIQUID DEVELOPER CLEANING MEANS. MAY 16, 1978.
4,105,445.—RESILIENT ARCUATE SURFACE CONTAINING PHOTOCONDUCTOR. AUG. 8, 1978. GRB. 1476355.
4,126,711.—CHARGE PATTERN DEVELOPMENT METHOD & APPARATUS. NOV. 21, 1978. GRB. 1484712.
4,161,360.—LIQUID DEVELOPMENT APPARATUS. JULY 17, 1979.

Class 5F

3,124,483.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. MAR. 10, 1964. CAN. 0843622.
3,166,432.—IMAGE DEVELOPMENT. JAN. 19, 1965. CAN. 0675704, FRA. 1260844, GER. 1185062, GRB. 0959668, JAP. 0401040.
3,203,394.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 31, 1965. CAN. 0757572, GER. 1497070, GRB. 1026704, JAP. 0464922.

3,216,844.—METHOD OF DEVELOPING ELECTROSTATIC IMAGES WITH PHOTOCONDUCTIBLE DONOR MEMBER. NOV. 9, 1965. CAN. 0794035, GRB. 1024983.
3,301,152.—XEROGRAPHIC COPYING APPARATUS. JAN. 31, 1967.
3,332,396.—XEROGRAPHIC DEVELOPING APPARATUS WITH CONTROLLED CORONA MEANS. JULY 25, 1967. AUS. 0287695, BEL. 0656893, CAN. 0775061, FRA. 1419973, GER. 1288915, GRB. 1060679, ITL. 0745583.
3,375,806.—XEROGRAPHIC DONOR DEVELOPMENT APPARATUS. APR. 2, 1968.
3,376,852.—DIELECTRIC BELT DEVELOPING. APR. 9, 1968. CAN. 0859028, GRB. 1214512, JAP. 0919364.
3,405,682.—XEROGRAPHIC DEVELOPMENT APPTS WITH WEB LOADING MEANS TO REMOVE RESIDUAL DEVELOPER. OCT. 15, 1968. GRB. 1102282.
3,606,864.—DONOR ASSEMBLY. SEPT. 21, 1971. CAN. 0903461, GRB. 1280951, MEX. 0116025.
3,613,636.—ELECTROGRAPHIC DEVELOPER. OCT. 19, 1971. GRB. 1282991.
3,635,196.—PNEUMATICALLY CONTROLLED SEAL. JAN. 18, 1972.
3,645,618.—VACUUM NOZZLE TO REMOVE AGGLOMERATES ON A TONER APPLICATOR. FEB. 29, 1972. CAN. 0949823.
3,696,783.—AUTOMATED TOUCHDOWN DEVELOPMENT SYSTEM. OCT. 10, 1972. CAN. 0949822, GRB. 1373666.
3,696,785.—DEVELOPMENT APPARATUS. OCT. 10, 1972. CAN. 0949824, GRB. 1373665.
3,697,169.—ELECTROSTATIC RECORDING APPARATUS AND METHOD. OCT. 10, 1972. CAN. 0954292, GRB. 1322681.
3,703,157.—MTHD/APPRTS FOR FRMNG UNFRM LYR OF PWDR DVELPR ON A SURFACE. NOV. 21, 1972.
3,707,389.—LATENT ELECTROSTATIC IMAGE DEVELOPMENT. DEC. 26, 1972. AUS. 0457281, BEL. 0777721, CAN. 0949827, FRA. 7201007, GRB. 1375048, ITL. 0946354.
3,729,334.—IMAGING PROCESS. APR. 24, 1973.
3,739,748.—DONOR FOR TOUCHDOWN DEVELOPMENT. JUNE 19, 1973.
3,759,222.—MICROFIELD DONOR WITH CONTINUOUSLY REVERSING MICROFIELDS. SEPT. 18, 1973. BEL. 0780091, CAN. 0951596, FRA. 7208102, GRB. 1385966, ITL. 0949779.
3,848,566.—DONOR APPARATUS. NOV. 19, 1974.
3,866,574.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 18, 1975, FRA. 7405248, GRB. 1458766.
3,881,927.—HALF TONE DEVELOPMENT PROCESS FOR TOUCHDOWN SYSTEM IN ELECTROSTATIC IMAGING. MAY 6, 1975. GRB. 1419926.
3,884,185.—COATED WIRE DEVELOPER BRUSH. MAY 20, 1975.
3,890,929.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 24, 1975.
3,893,418.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 8, 1975.
3,900,002.—DONOR APPARATUS. AUG. 19, 1975.
3,914,460.—DEVELOPMENT UTILIZING ELECTRIC FIELDS. OCT. 21, 1975.
3,929,098.—TONER LOADING FOR TOUCHDOWN DONOR. DEC. 30, 1975.
3,970,042.—COLOR DEVELOPMENT APPARATUS. JULY 20, 1976.
3,997,688.—DEVELOPING AN ELECTRICAL IMAGE. DEC. 14, 1976.
3,998,185.—MICROFIELD DONORS WITH TONER AGITATION AND THE METHODS OF THEIR MANUFACTURE. DEC. 21, 1976.
3,999,515.—SELF SPACING MICROFIELD DONORS. DEC. 28, 1976.
3,999,849.—TOUCHDOWN AMBIPOLAR DEVELOPMENT. DEC. 28, 1976.
4,003,333.—DEVELOPMENT SYSTEM. JAN. 18, 1977.
4,006,981.—HALF TONE DEVELOPMENT FOR TOUCHDOWN SYSTEM. FEB. 8, 1977. GRB. 1419926.
4,011,834.—TOUCHDOWN ELECTROSTATIC DEVELOPMENT APPARATUS. MAR. 15, 1977.
4,017,648.—TONER AGITATION THROUGH MICROFIELD DONOR. APR. 12, 1977.
4,025,185.—APPLICATOR MEMBER. MAY 24, 1977. GRB. 1436098.
4,040,827.—DEVELOPMENT IMAGING METHODS. AUG. 9, 1977.
4,067,295.—MAGNETIC MICROFIELD DONOR SYSTEM. JAN. 10, 1978.
4,092,165.—METHOD OF MAKING A DONOR MEMBER MOLD. MAY 30, 1978.
4,105,445.—RESILIENT ARCUATE SURFACE CONTAINING PHOTOCONDUCTOR. AUG. 8, 1978. GRB. 1476355.
4,114,261.—METHOD OF MANUFACTURE OF A XEROGRAPHIC MICROFIELD DONOR. SEPT. 19, 1978. GRB. 1515938.
4,136,637.—CONTINUOUS CONTRAST DEVELOPMENT SYSTEM. JAN. 30, 1979.
4,144,061.—TRANSFER DEVELOPMENT USING A FLUID SPACED DONOR MEMBER. MAR. 13, 1979.
4,149,486.—TRANSFER DEVELOPMENT APPARATUS USING SELF-SPACING DONOR MEMBER. APR. 17, 1979.
4,164,372.—OUT OF CONTACT TOUCHDOWN. AUG. 14, 1979. CAN. 1044958. GRB. 1484417.

Class 5G

3,380,437.—TRANSVERSELY RECIPROCATING FLUIDIZED BED DEVELOPMENT APPARATUS. APR. 30, 1968. ARG. 0179553, BRA. 0088502, CAN. 0821491, CHL. 0022941, CLB. 0016330, MEX. 0095936, PRU. 0009315, URG. 0008636, VZL. 0020996.
3,393,663.—FLUIDIZING ELECTRODE DEVELOPMENT APPARATUS. JULY 23, 1968. ARG. 0171118, AUS. 0411962, BEL. 0701467, CAN. 0821472, CHL. 0024009, CLB. 0017645, CZC. 0157025, DNK. 0123998, EGR. 0072982, FRA. 1531274, GRB. 1193443, ISR. 0028298, ITL. 0805956. LXB. 0054062, MEX. 0095697, NOR. 0127834, NZL. 0149432, PLD. 0069038, PTG. 0048069, SAF. 0674268, SPN. 0343103, STZ. 0481406, SWD. 0322414, USR. 0353449, VZL. 0021059.
3,396,700.—XEROGRAPHIC TONER DISPENSING APPARATUS. AUG. 13, 1968. CAN. 0852126, GRB. 1231868, JAP. 0752503.
3,574,660.—ORBITAL DEVELOPER STREAM DEVELOPMENT. APR. 13, 1971. CAN. 0845076, GRB. 1193277.
3,641,977.—APPARATUS FOR AGITATING DEVELOPER MATERIAL WITHIN A HOUSING. FEB. 15, 1972. CAN. 0917405, GRB. 1342684.
3,682,137.—J-SHELL DEVELOPER HOUSING. AUG. 8, 1972. CAN. 0949820, GRB. 1342782.
3,900,001.—DEVELOPING APPARATUS. AUG. 19, 1975. CAN. 0970631, GRB. 1381049.

Class 5H

3,484,265.—TRANSVERSELY RECIPROCATING FLUIDIZED BED DEVELOPMENT METH. DEC. 16, 1969.
3,503,776.—XEROGRAPHIC DEVELOPMENT. MAR. 31, 1970. CAN. 0828694, FRA. 1511809, GRB. 1182291, ITL. 0793692, MEX. 0098765.
3,611,991.—VIBRATING BED DEVELOPING APPARATUS WITH ELECTROMAGNETIC DEVELOPER AGITATOR. OCT. 12, 1971. AUS. 0445409, BEL. 0755605, CAN. 0911707, EGR. 0083516, FRA. 7032503, GRB. 1264780, ITL. 0907435, JAP. 0745766, SPN. 0383333, STZ. 0521615, SWD. 0361956, TIW. 0007201, USR. 0371738.
3,613,637.—DEVELOPER FOR ELECTROSTATIC IMAGES. OCT. 19, 1971. AUS. 0448238, BEL. 0752034, CAN. 0911702, FRA. 7021987, GRB. 1301157, ITL. 0894180, SWD. 0358975.
3,621,816.—INTERLACED VIBRATING ELECTRODE. NOV. 23, 1971. CAN. 0914397, GRB. 1316614, JAP. 0835102.
3,623,454.—FLUIDIZED BED DEVELOPMENT APPARATUS. NOV. 30, 1971. CAN. 0895208, GRB. 1272373, JAP. 0731616.
3,654,900.—FLUIDIZED DEVELOPMENT OF ELECTROSTATIC IMAGES. APR. 11, 1972. CAN. 0949821, GRB. 1357149.
3,685,486.—FLUIDIZED DEVELOPMENT APPARATUS. AUG. 22, 1972. CAN. 0921693, GRB. 1316306, JAP. 0746925.
3,754,531.—FLUIDIZED DEVELOPMENT APPARATUS. AUG. 28, 1973.
3,844,252.—SHEET REMOVAL DEVICE. OCT. 29, 1974. BEL. 0814943, CAN. 1000749, FRA. 7415957, ITL. 1012669, PNM. 0003193, PTG. 0061701, SPN. 0426423, SWD. 7406337.

Class 5I

3,838,922.—APPARATUS FOR SENSING THE QUANTITY OF RECLAIMED DEVELOPER MATERIAL. OCT. 1, 1974. CAN. 0992600, GRB. 1414319.
3,841,265.—DEVELOPER ASSEMBLY FOR ELECTROSTATIC COPIER. OCT. 15, 1974.
3,844,252.—SHEET REMOVAL DEVICE. OCT. 29, 1974. BEL. 0814943, CAN. 1000749, FRA. 7415957, ITL. 1012669, PNM. 0003193, PTG. 0061701, SPN. 0426423, SWD. 7406337.

3,873,197.—APPARATUS FOR REGULATING THE TONER CONCENTRATION IN A ELECTROPHOTOGRAPHIC DEVICE. MAR. 25, 1975.
3,926,338.—THERMALLY INSENSITIVE PARTICLE CONCENTRATION CONTROLLER. DEC. 16, 1975.
4,065,031.—PROGRAMMABLE DEVELOPMENT CONTROL SYSTEM. DEC. 27, 1977.

Class 5I 1

3,316,875.—XEROGRAPHIC DEVELOPING APPARATUS. MAY 2, 1967.
3,331,355.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 18, 1967. CAN. 0793224, FRA. 1465811, GRB. 1069351, ITL. 0778708.
3,349,750.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 31, 1967. CAN. 0819050, FRA. 1516053, GRB. 1165377, ITL. 0788953, JAP. 0547202, MEX. 0093862.
3,356,248.—CONTAINER WITH A ROTATABLE CLOSURE. DEC. 5, 1967. CAN. 0825091, GRB. 1166618.
3,550,556.—DEVELOPMENT APPARATUS. DEC. 29, 1970. ARG. 0180677, AUS. 0442279, BEL. 0726571, BRA. 6905449, CAN. 0882576, CZC. 0157055, EGR. 0076888, FRA. 1604314, GRB. 1252494, ITL. 0854006, JAP. 0731247, MEX. 0109983, PNM. 0001770, RMN. 0054558, SAF. 0069180, SPN. 0362037, STZ. 0498431, SWD. 0351059, USR. 0372851, VZL. 0023724.
3,661,118.—ELECTROSTATIC DEVELOPMENT. MAY 9, 1972. CAN. 0951107, GRB. 1359234.
3,662,711.—DEVELOPMENT APPARATUS. MAY 16, 1972. CAN. 0945757, GRB. 1345253.
3,663,291.—CASCADE DEVELOPMENT. MAY 16, 1972.
3,687,270.—CONVEYOR ASSEMBLY. AUG. 29, 1972. CAN. 0952464, GRB. 1376231.
3,717,122.—MAGNETIC GATE. FEB. 20, 1973. CAN. 0960031, GRB. 1377023.
3,943,887.—HYBRID CROSSMIXER. MAR. 16, 1976.
3,947,107.—PARTIALLY SUBMERGED ACTIVE CROSSMIXER. MAR. 30, 1976. BEL. 0835370.
3,973,518.—CROSS MIXING BLENDING CHAMBER FOR ELECTROSTATIC PROCESSORS AND THE LIKE. AUG. 10, 1976.
3,995,590.—BLENDING CHAMBER FOR ELECTROSTATIC PROCESSORS. DEC. 7, 1976.
3,999,512.—ELECTROSTATIC DEVELOPMENT SYSTEM WITH PASSIVE STORAGE CAPACITY. DEC. 28, 1976. BEL. 0823656.
4,040,386.—RETRACTABLE EDGE SEALS FOR ELECTROSTATOGRAPHIC DEVELOPMENT SYSTEMS. AUG. 9, 1977.
4,056,076.—DEVELOPER MIXING SYSTEM. NOV. 1, 1977.

Class 5I 2

3,941,280.—APPARATUS FOR CONTROLLING DEVELOPER EFFICIENCY. MAR. 2, 1976.
3,983,841.—TONER RECLAIM CONVEYOR. OCT. 5, 1976.
4,011,835.—TONER CONVEYOR. MAR. 15, 1977.
4,133,458.—TONER DISPENSER ARRANGEMENT. JAN. 9, 1979.
4,133,459.—DEFORMABLE TONER DISPENSER WITH FLOW RATE CONTROLLER. JAN. 9, 1979.
4,135,642.—WIPER ARRANGEMENT FOR TONER LEVEL SENSOR. JAN. 23, 1979.
4,142,655.—TONER DISPENSING AND SUPPLY ARRANGEMENT. MAR. 6, 1979.
4,188,907.—PARTICLE DISPENSER WITH A MAGNETICALLY DRIVEN AGITATOR. FEB. 19, 1980.

Class 5I 2A

3,122,455.—XEROGRAPHIC TONER DISPENSER. FEB. 25, 1964.
3,135,433.—XEROGRAPHIC TONER DISPENSING APPARATUS. JUNE 2, 1964. CAN. 0701240.
3,149,760.—POWDER DISPENSING APPARATUS. SEPT. 22, 1964.
3,250,439.—XEROGRAPHIC TONER DISPENSER. MAY 10, 1966. CAN. 0815453, GRB. 1126197, JAP. 0512654.
3,337,072.—LOADER. AUG. 22, 1967. CAN. 0825092, GRB. 1166619, JAP. 0605648.
3,385,500.—TONER PACKAGE. MAY 28, 1968. CAN. 0864337, GRB. 1189147, JAP. 0931680.
3,619,279.—TONER RECEIVING MEMBER. NOV. 9, 1971.
3,622,054.—TONER DISPENSER IMPROVEMENT. NOV. 23, 1971. CAN. 0911705.
3,722,471.—TONER METER DEVICE. MAR. 27, 1973. CAN. 0951108, GRB. 1370009.
3,740,288.—METHOD OF PREPARING A TONER DISPENSER. JUNE 19, 1973.
3,920,155.—PARTICLE LEVEL INDICATOR. NOV. 18, 1975.
3,924,566.—REPRODUCTION MACHINE WITH MEANS FOR SOLIDIFYING THE RECLAIM TONER. DEC. 9, 1975.
3,941,470.—A TONER PARTICLE DISPENSER. MAR. 2, 1976.
3,951,539.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED TONER DISPENSING APPARATUS. APR. 20, 1976.
3,954,331.—TONER DISPENSER. MAY 4, 1976.
3,979,022.—MONITORING DEVICE—MAGNETIC POWERED ALARM DEVICE. SEPT. 7, 1976. BEL. 0801607, CAN. 0982841, FRA. 7300103, GRB. 1431574, ITL. 0990693, SWD 7308931.
4,034,701.—PARTICLE DISPENSER—01TONER DISPENSER—EPIC. JULY 12, 1977. BEL. 0801243, CAN. 0979209, FRA. 7323735, GRB. 1,438,799, ITL. 0990691, SWD. 7,308,929.

Class 5I 2B

3,389,863.—XEROGRAPHIC TONER DISPENSER. JUNE 25, 1968. CAN. 0835862, FRA. 1497062, GRB. 1171303, ITL. 0787552, JAP. 0589523, MEX. 0093821, VZL. 0024004.
3,390,664.—XEROGRAPHIC TONER DISPENSING APPARATUS. JULY 2, 1968. CAN. 0852124, GRB. 1208593, JAP. 0608323.
3,619,279.—TONER RECEIVING MEMBER. NOV. 9, 1971.

Class 5I 2C

3,951,539.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED TONER DISPENSING APPARATUS. APR. 20, 1976.
3,956,108.—ANTI-PLUGGING DEVICE FOR AUTOMATIC DEVELOPABILITY CONTROL SYSTEMS. MAY 11, 1976.
3,958,878.—ELECTROSTATIC PROCESSOR HOUSING INTERCHANGABLE RESERVOIRS FOR SUPPING & RECLAIMING TONER. MAY 25, 1976.
3,974,944.—TONER DISPENSER. AUG. 17, 1976.
4,065,031.—PROGRAMMABLE DEVELOPMENT CONTROL SYSTEM. DEC. 27, 1977.
4,163,614.—CLOSED LOOP PARTICLE DISPENSER. AUG. 7, 1979.
4,173,294.—DISPENSER HAVING RECIPROCATING PADDLES FOR DISCHARGING PARTICLES THEREFROM. NOV. 6, 1979.

Class 5I 2C 1

RE.27,876.—DISPENSING APPARATUS. JAN. 8, 1974. CAN. 0868818.
3,300,101.—TONER DISPENSER. JAN. 24, 1967. CAN. 0800856, GRB. 1152671, JAP. 0524530.
3,339,807.—TONER CONTAINER AND DISPENSER. SEPT. 5, 1967. CAN. 0842133, GRB. 1165953, JAP. 0547201.
3,396,700.—XEROGRAPHIC TONER DISPENSING APPARATUS. AUG. 13, 1968. CAN. 0852126, GRB. 1231868, JAP. 0752503.
3,453,045.—XEROGRAPHIC DEVELOPMENT APPARATUS. JULY 1, 1969. CAN. 0852125, FRA. 1559973, GRB. 1213493, HUN. 0156188, ITL. 0832847, JAP. 0602169, USR. 0371739.
3,538,887.—ELECTROSCOPIC TONER POWDER DISPENSER. NOV. 10, 1970.
3,542,089.—TONER DISPENSER. NOV. 24, 1970. CAN. 0885916.
3,596,807.—DISPENSING APPARATUS—REISSUED D2184R RE27876. AUG. 3, 1971. CAN 0868818.
3,608,792.—APPARATUS FOR DISPENSING FINELY DIVIDED PARTICULATE MATERIAL. SEPT. 28, 1971. ARG. 0182132, ATR. 0311790, AUS. 0456817, BEL. 0745602, CAN. 0869923, CHL. 0025844, DNK. 0128336, FRA. 7003984, GRB. 1302401, GUA. 0002512, ITL. 0886722, MEX. 0119828, NZL. 0159117, PNM. 0002240, SAF. 0700806, SPN. 0376265, STZ. 0526801, SWD. 7001426, TIW. 0005927, VZL. 0032924.
3,654,900.—FLUIDIZED DEVELOPMENT OF ELECTROSTATIC IMAGES. APR. 11, 1972. CAN. 0949821, GRB. 1357149.
3,655,033.—VIBRATORY BOWL—TONER DISPENSER. APR. 11, 1972.
3,752,576.—TRANSPORT FOR PARTICULATE MATERIAL. AUG. 14, 1973.
3,896,279.—TNE LVL DETCTR ASSEMBLY INC MAGNETICLY RESPONSIVE SWITCH ACTUATD BY DFERENTL LOADED BLADE TYPE. JULY 22, 1975.
3,901,187.—DEVELOPER RETONING APPARATUS. AUG. 26, 1975.
3,920,154.—TONER LEVEL DETECTOR. NOV. 18, 1975.

3,951,539.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED TONER DISPENSING APPARATUS. APR. 20, 1976.

Class 51 2C 2

3,348,522.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799397, GRB. 1135743, JAP. 0942998, MEX. 0089292.

3,348,523.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799399, GRB. 1139299, JAP. 5371200.

3,376,853.—ELECTROSTATIC TONER CONTROL. APR. 9, 1968. CAN. 0819051, GRB. 1177232, JAP. 0568731.

3,376,854.—AUTOMATIC TONER DISPENSING CONTROL—SEE D2425 FOR RE27480. APR. 9, 1968. ARG. 0164003, ATR. 0279352, AUS. 0416453, BEL. 0699115, CAN. 0866349, CHL. 0022942, CLB. 0016441, CZC. 0160633, DNK. 0116114, EGR. 0067870, EIR. 0031100, FRA. 1524678, GRB. 1186775, GRK. 0033692, IND. 0110760, ISR. 0028022, ITL. 0796438, JAP. 0800113, LXB. 0053713, MEX. 0099990, NOR. 0128039, NZL. 0148850, PAK. 0118694, PLD. 0069794, PLP. 0005554, PRU. 0009348, PTG. 0047758, SAF. 0673111, SPN. 0340983, STZ. 0473409, SWD. 6707266, TRK. 0014624, UAR. 0008620, URG. 0008538, USR. 0494887, VZL. 0023661.

3,430,606.—ELECTROSCOPIC PARTICLE SENSOR. MAR. 4, 1969. BEL. 0726274, BRA. 6805010, CAN. 0891683, FRA. 1597321, ITL. 0866513, MEX. 0107599, PNM. 0001400, USR. 0336895, VZL. 0023727.

3,498,500.—LEVEL SENSOR. MAR. 3, 1970. CAN. 0912851, GRB. 1251128, JAP. 0663856.

3,520,445.—DIELECTRIC LEVEL SENSOR. JULY 14, 1970. CAN. 0895527, GRB. 1239856, JAP. 0663857.

3,526,338.—METHOD AND CONTROLLER FOR DISPENSING ELECTROSCOPIC MATERIAL—AUTOMATIC TONER DISPENSER CONTROL—24. SEPT. 1, 1970. ARG. 0181603, AUS. 0436922, BEL. 0726274, BRA. 6804852, CAN. 0895526, GRB. 1216690, ITL. 0866513, JAP. 0752505, MEX. 0107687, PNM. 0001419, SPN. 0362036, SWD. 0355090, USR. 0336895, VZL. 0023723.

3,527,387.—DEVELOPER REPLENISHING PROGRAMMING SYSTEM. SEPT. 8, 1970. CAN. 0922772, GRB. 1233814, JAP. 0758340.

3,536,042.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 27, 1970.

3,604,939.—TONER SENSING APPARATUS—TONER SENSOR ASSEMBLY-GENIE. SEPT. 14, 1971. CAN. 0915751, GRB. 1260379, JAP. 0752502.

3,635,373.—AUTOMATIC DEVELOPABILITY CONTROL APPARATUS. JAN. 18, 1972. ARG. 0190708, AUS. 0445334, BEL. 0760748, CAN. 0923546, CHL. 0025916, EGR. 0091983, FRA. 7047630, GRB. 1336590, GUA. 0002624, ITL. 0913903, JAP. 0795149, MEX. 0116721, PNM. 0002092, SPN. 0386750, STZ. 0524843, SWD. 0362511, TIW. 0007197.

3,659,556.—PROGRAMMABLE TONER DISPENSER. MAY 2, 1972. BEL. 0771423, CAN. 0936681, FRA. 7130743, GRB. 1358448, ITL. 0934010.

3,692,403.—AUTOMATIC CONTROL OF TONER CONCENTRATIONS. SEPT. 19, 1972. CAN. 0979635, GRB. 1409578.

3,693,581.—TONER DISPENSER CIRCUIT FOR ELECTROSTATOGRAPHIC APPARATUS. SEPT. 26, 1972.

3,727,065.—AUTOMATIC DEVELOPABILITY CONTROL SYSTEM. APR. 10, 1973. ARG. 0185080, AUS. 0440458, BEL. 0757430, CAN. 0934806, CHL. 0025915, CZC. 0169811, FGR. 0086755, FRA. 7038235, GRB. 1318895, ITL. 0908953, JAP. 0795148, MEX. 0116873, PNM. 0002179, SPN. 0384593, STZ. 0514168, SWD. 0369114, TIW. 0007196, VZL. 0032004.

3,754,821.—AUTOMATIC DEVELOPMENT CONTROL. AUG. 28, 1973. ARG. 0195188, AUS. 0467463, BEL. 0793425, CAN. 1004725, FRA. 7246724, GRB. 1411448, ITL. 0972845, JAP. 0552838, MEX. 0128209, NZL. 0169419, SAF. 7219030, SPN. 0410096, STZ. 0552838, SWD. 7216891, VZL. 0032066.

3,757,999.—AUTOMATIC DEVELOPABILITY CONTROL SYSTEM FOR ELECTROSTATIC RECORDING APPARATUS. SEPT. 11, 1973. ARG. 0185080, AUS. 0440458, BEL. 0757430, CAN. 0934806, CHL. 0025915, CZC. 0169811, EGR. 0086755, FRA. 7038235, GRB. 1318895, ITL. 0908953, JAP. 0795148, MEX. 0116873, PNM. 0002179, SPN. 0384593, STZ. 0514168, SWD. 0369114, TIW. 0007196, VZL. 0032004.

3,778,146.—ILLUMINATING APPARATUS. DEC. 11, 1973.

3,801,196.—TONER CONCENTRATION REGULATING APPARATUS. APR. 2, 1974.

3,814,516.—HUMIDITY COMPENSATED CONTROL DEVICE. JUNE 4, 1974. CAN. 1012202, GRB. 1458558.

3,825,337.—COLOR BALANCE DISPLAY. JULY 23, 1974. CAN. 1006766.

3,834,806.—PARTICLE LEVEL INDICATOR. SEPT. 10, 1974.

3,872,825.—PARTICLE CONCENTRATION DETECTOR. MAR. 25, 1975. CAN. 1014598.

3,873,002.—TONER DISPENSER LOGIC CONTROL. MAR. 25, 1975. BEL. 0813798, CAN. 1008915, GRB. 1457565, ITL. 1009837.

3,893,408.—TONER DISPENSER SYSTEM. JULY 8, 1975.

3,894,799.—APPARATUS FOR MONITORING COPY QUALITY. JULY 15, 1975.

3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.

3,936,176.—DEVICE FOR MAINTAINING A DEVELOPABILITY REGULATING APPARATUS CONTAMINANT FREE. FEB. 3, 1976.

3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.

3,969,114.—METHOD FOR MONITORING COPY QUALITY. JULY 13, 1976.

3,999,119.—MEASURING TONER CONCENTRATION. DEC. 21, 1976.

4,026,643.—APP & MTHD FOR MEASUREMENT OF THE RTO OF TNR PRTLCS ELCTRSTATC CHRGE TO TNR PRTLE MASS IN ELCTSTC. MAY 31, 1977.

4,032,225.—COPYING MACHINES. JUNE 28, 1977.

4,043,293.—DEVELOPABILITY REGULATING APPARATUS. AUG. 23, 1977.

4,076,149.—SLAVE DRIVER FOR TONER DISPENSER WITH STRIKER. FEB. 28, 1978.

4,079,266.—ELECTRONIC CONTROL FOR AUTOMATIC DEVELOPABILITY SYSTEM. MAR. 14, 1978.

4,082,445.—TONER CONTROL SYSTEM FOR AN ELECTROSTATIC REPRODUCTION MACHINE. APR. 4, 1978. BEL. 848542.

4,111,151.—MULTI-PARTICLE DEVELOPABILITY REGULATING SYSTEM. SEPT. 5, 1978.

4,113,371.—A COLOR DEVELOPMENT SYSTEM. SEPT. 12, 1978.

Class 5J

3,804,510.—IMAGING DEVELOPING SYSTEM. APR. 16, 1974.

3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700, GRB. 1464886.

3,893,415.—DEVELOPING APPARATUS. JULY 8, 1975. ARG. 0204387, BEL. 0789238, BRA. 0088405, CAN. 0991394, FRA. 7232380, GRB. 1409815, ITL. 0970948, MEX. 0128578, SPN. 0408654, STZ. 0554551, SWD. 7214863, VZL. 0033578.

3,908,037.—IMAGE DEVELOPING TECHNIQUES. SEPT. 23, 1975. CAN. 0980181, GRB. 1406292.

3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.

Class 5J 1

3,147,147.—XEROGRAPHIC DEVELOPING APPARATUS AND ELECTRODE. SEPT. 1, 1964. CAN. 0738918, GRB. 1007167.

3,241,466.—ELECTROSTATIC PHOTOGRAPHY. MAR. 22, 1966.

3,424,131.—ELECTRODED CASCADE DEVELOPMENT SYSTEM. JAN. 28, 1969. CAN. 0848084, FRA. 1463050, GER. 1497214, GRB. 1123618, ITL. 0729637, JAP. 0499007.

3,606,863.—DEVELOPMENT ELECTRODE. SEPT. 21, 1971. CAN. 0905099, GRB. 1296756, JAP. 0774497.

3,611,992.—CLEANUP ELECTRODE. OCT. 12, 1971. CAN. 0916431.

3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972.

3,648,658.—DEVELOPING APPARATUS. MAR. 14, 1972.

3,651,784.—LOW POTENTIAL DEVELOPMENT ELECTRODE. MAR. 28, 1972. CAN. 0917900.

3,670,700.—DEVELOPMENT ELECTRODE. JUNE 20, 1972. ARG. 0185528, ATR. 0324836, AUS. 0445848, BEL. 0752935, CAN. 0916430, CHL. 0025837, DNK. 0126729, EGR. 0085926, FRA. 7024671, GRB. 1304065, IND. 0127310, ITL. 0900194, JAP. 0731613, MEX. 0115164, NOR. 0131437, NZL. 0160642, PLP. 0006295, PNM. 0001951, PTG. 0054071, SAF. 0704531, SPN. 0381380, STZ. 0513439, SWD. 0358976, TIW. 0007161, USR. 0503555, VZL. 30684.

3,741,156.—XEROGRAPHIC DEVELOPMENT APPARATUS. JUNE 26, 1973.

3,778,144.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. DEC. 11, 1973. CAN. 0972550, GRB. 1393144.

3,784,299.—DARK DECAY RETARDATION. JAN. 8, 1974.

3,790,397.—RETONING CARRIER BEADS IN THE DEVELOPMENT ZONE. FEB. 5, 1974.
3,795,222.—DEVELOPMENT ELECTRODE SYSTEM. MAR. 5, 1974.
3,816,114.—ELECTRO-PHOTOGRAPHIC METHOD. JUNE 11, 1974.
3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974.
3,832,975.—ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 3, 1974.
3,955,976.—DEVELOPING METHOD IN ELECTROPHOTOGRAPHY-DEVELOPING METHOD IN ELECTROPHOTOGRAPHY. MAY 11, 1976. GRB. 1329143.

Class 5J 2

3,416,494.—XEROGRAPHIC DEVELOPMENT ELECTRODE. DEC. 17, 1968. CAN. 0882575, GER. 1816690, GRB. 1249664, JAP. 0653014.
3,621,816.—INTERLACED VIBRATING ELECTRODE. NOV. 23, 1971. CAN. 0914397, GRB. 1316614, JAP. 0835102.

Class 5J 3

3,349,676.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. OCT. 31, 1967. CAN. 0814087, FRA. 1473662, GER. 1522685, GRB. 1144766, ITL. 0764006, JAP. 0513609, MEX. 0090133.
3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. BEL. 0815546, CAN. 1009503, FRA. 7418641, GRB. 1448386, ITL. 1012842, SPN. 0426760.

Class 5J 4

3,105,777.—XEROGRAPHIC DEVELOPING APPARATUS. OCT. 1, 1963. CAN. 0700762.

Class 5J 5

3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.
3,438,705.—AUTOMATIC XEROGRAPHIC DEVELOPMENT CONTROL. APR. 15, 1969. GRB. 1207830.
3,611,982.—DEVELOPMENT ELECTRODE CONTROL APPARATUS. OCT. 12, 1971. ARG. 0185532, AUS. 0450067, BEL. 0755383, BRA. 0088402, CAN. 0913353, CHL. 0025834, EGR. 0090283, FRA. 7032350, GRB. 1303148, ITL. 0901777, JAP. 0758461, MEX. 0117918, PLD. 80986, PNM. 0002245, SPN. 0383058, STZ. 0523526, SWD. 0361750, TIW. 0007514, USR. 0473382, VZL. 0032598.
3,696,784.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 10, 1972. BEL. 0776601, CAN. 0951109, FRA. 7146241, GRB. 1369648, ITL. 0943905.
3,719,169.—PLURAL ELECTRODE DEVELOPMENT APPARATUS. MAR. 6, 1973. CAN. 0979299, GRB. 1381910.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974.
3,788,739.—IMAGE COMPENSATION METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHIC DEVICES. JAN. 29, 1974.
3,805,739.—CONTROLLING MULTIPLE VOLTAGE LEVELS FOR ELECTROSTATIC PRINTING. APR. 23, 1974. CAN. 0972552, GRB. 1382710.
3,810,165.—ELECTRONIC DISPLAY DEVICE. MAY 7, 1974.
3,815,988.—IMAGE DENSITY CONTROL APPARATUS. JUNE 11, 1974. ARG. 0205710, BEL. 0815209, FRA. 7416693, GRB. 1458707, ITL. 1012346, SAF. 0743132.
3,818,864.—IMAGE DEVELOPING APPARATUS. JUNE 25, 1974. CAN. 0980181, GRB. 1406292.
3,888,666.—REVERSAL DEVELOPING METHOD USING PHOTOCONDUCTIVE DEVELOPING ELECTRODE. JUNE 10, 1975.
3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700, GRB. 1464886.
4,084,538.—AMBIENT TEMPERATURE COMPENSATING DEVICE FOR POWER SOURCE APPARATUS FOR DEVELOPING ELECTRODE. APR. 18, 1978.

Class 5K

3,212,889.—XEROGRAPHIC CONTRAST CONTROL. OCT. 19, 1965. GRB. 1008897.
3,251,685.—METHOD OF CONTROLLING CONTRAST IN A XEROGRAPHIC REPRODUCTION PROCESS. MAY 17, 1966. CAN. 0707047, GER. 1265583, JAP. 0446813.
3,540,806.—HALF TONING METH AND APPARATUS FOR SOLID AREA COVERAG. NOV. 17, 1970. CAN. 0892754, GRB. 1253888.
3,669,072.—DEVELOPER APPARATUS. JUNE 13, 1972. CAN. 0930539, GRB. 1343141.
3,707,947.—CROSS-CHANNEL MIXER. JAN. 2, 1973. ARG. 0200109, ATR. 0322982, AUS. 0457444, BEL. 0776661, CAN. 0946145, CHL. 0027259, DNK. 0132048, EGR. 0099026, FRA. 7145340, GRB. 1372731, ITL. 0943876, MEX. 0127352, PNM. 0002585, SAF. 0718308, SPN. 0397852, STZ. 0557554, TIW. 0005832, USR. 0402245.
3,808,026.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. APR. 30, 1974.
3,817,748.—CONTRAST CONTROL IN ELECTROSTATIC COPYING UTILIZING LIQUID DEVELOPMENT. JUNE 18, 1974. CAN. 0991246, GRB. 1406794.
3,865,080.—TONER PICKOFF APPARATUS. FEB. 11, 1975. GRB. 1430876.
3,865,612.—XEROGRAPHIC DEVELOPMENT METHOD. FEB. 11, 1975.
3,887,367.—METHOD FOR TEMPERATURE STABILIZING PHOTORECEPTORS. JUNE 3, 1975.
3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700, GRB. 1464886.
3,893,413.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 8, 1975.
3,911,865.—TONER PICKOFF APPARATUS. OCT. 14, 1975.
3,946,920.—VACUUM SYSTEM CONTROL. MAR. 30, 1976.
3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.
3,994,725.—MEANS FOR ENHANCING REMOVAL OF BACKGROUND TONER PARTICLE. NOV. 30, 1976.
3,997,259.—APPARATUS FOR REDUCING IMAGE BACKGROUND IN ELECTROSTATIC REPRODUCTION MACHINES. DEC. 14, 1976.
4,023,900.—VARIABLE SPEED LIQUID DEVELOPMENT ELECTROSTATOGRAPHIC APPARATUS. MAY 17, 1977.

Class 5K 5

4,161,357.—PHOTORECEPTOR HEATING APPARATUS. JULY 17, 1979.

Class 5L

3,245,823.—ELECTROSTATIC IMAGE DEVELOPMENT APPARATUS. APR. 12, 1966.
3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.

Class 5M

3,712,728.—REVERSAL DEVELOPMENT. JAN. 23, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.
3,772,012.—REVERSAL DEVELOPMENT USING POLAR LIQUID DEVELOPERS. NOV. 13, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.
3,800,744.—ELECTROSTATIC LATENT IMAGE DEVELOPING APPARATUS. APR. 2, 1974.
3,877,963.—REVERSAL LIQUID DEVELOPING USING A DEVELOPMENT ELECTRODE AND CORONA CHARGING. APR. 15, 1975.
3,888,666.—REVERSAL DEVELOPING METHOD USING PHOTOCONDUCTIVE DEVELOPING ELECTRODE. JUNE 10, 1975.
3,901,698.—METHOD OF REVERSAL DEVELOPMENT USING TWO ELECTROSTATIC DEVELOPERS. AUG. 26, 1975.

Class 5N

3,907,693.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY. SEPT. 23, 1975.
3,907,694.—NON-VOLATILE CONDUCTIVE INKS. SEPT. 23, 1975.
3,954,640.—ELECTROSTATIC PRINTING INKS. MAY 4, 1976. BEL. 0816553, GRB. 1452556.
3,963,486.—ELECTROPHOTOGRAPHIC IMAGING PROCESS EMPLOYING EPOXY-ESTER CONTAINING LIQUID DEVELOPER. JUNE 15, 1976.
4,024,292.—PROCESS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES WITH INK. MAY 17, 1977. BEL. 0816553, GRB. 1452556.
4,047,943.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES WITH CONDUCTIVE LIQUID DEVELOPER. SEPT. 13, 1977.

4,075,391.—PRODUCTION OF FERRITE ELECTROSTATOGRAPHIC CARRIER MATERIAL HAVING IMPROVED PROPERTIES. FEB. 21, 1978. BEL. 847571, FRA. 7632899, SPN. 452858.

4,076,640.—PREPARATION OF SPHEROIDIZED PARTICLES. FEB. 28, 1978. SPN. 445496.

4,077,804.—METHOD OF PRODUCING TONER PARTICLES BY IN-SITU POLYMERIZATION AND IMAGING PROCESS. MAR. 7, 1978.

Class 5N 1A

3,609,082.—ELECTROSTATIC DEV PARTICLS CONTAING RESIN, COLORANT, METAL SALT AND PHTHALATE. SEPT. 28, 1971. ARG. 0165457, BAH. 0000094, BOL. 3389B, CAN. 0902985, CHL. 0023567, CLB. 0017680, DOR. 0001462, ECD. 0000168, ELS. 0001065. JAM. 0001897, MEX. 0100808, PNM. 0002016, PRU. 0009862, TRK. 0015594, URG. 0009288.

3,720,617.—AN ELECTROSTATIC DEVELOPER CONTAINING MODIFIED SILICON DIOXIDE PARTICLES. MAR. 13, 1973. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 2131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.

3,819,367.—IMAGING SYSTEM. JUNE 25, 1974. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.

3,820,986.—LIQUID DEVELOPMENT METHOD AND MATERIALS. JUNE 28, 1974.

3,833,364.—METHOD OF DEVELOPING ELECTROSTATIC IMAGE CHARGE. SEPT. 3, 1974.

3,850,830.—LIQUID DEVELOPER CONTAINING EXTENDER BODY PARTICLES. NOV. 26, 1974.

3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924.

4,051,077.—NON FILMING DUAL ADDITIVE DEVELOPER. SEPT. 27, 1977. AUS. 487989, BEL. 825924, FRA. 7505307, GRB. 1494360, SPN. 435074.

Class 5N 1B

3,577,345.—SOLID XEROGRAPHIC DEVELOPER. MAY 4, 1971. ARG. 0172448, ATR. 0325417, AUS. 0424173, BAH. 0000095, BEL. 0716084, BOL. 003270B, CAN. 0902983, CHL. 0025923, CLB. 0017674, DOR. 0001461, ELS. 0001064, FRA. 1567731, GRB. 1232117, GRK. 0037628, GUA. 0002003, HOL. 0148714, IND. 0116209, ISR. 0030116, ITL. 0851653, JAM. 0001848, JAP. 0623002, LXB. 0056197, MEX. 0119320, NOR. 0131653, NZL. 0164353, PNM. 0002062, PRU. 0009911, PTG. 0049749, SPN. 0354686, STZ. 0516180, SWD. 0338238, TIW. 0005096, TRD. 0000057, TRK. 0015620, URG. 0009286, VZL. 0023666.

3,590,000.—SOLID DEVELOPER FOR LATENT ELECTROSTATIC IMAGES. JUNE 29, 1971. ARG. 0172453, ATR. 0288860, AUS. 0480033, BAH. 0000093, BEL. 0716083, BOL. 3399B, CAN. 0902984, CHL. 0024050, DOR. 0001460, ECD. 0000198, ELS. 0001062, FRA. 1567721, GER. 1772570, GRB. 1232118, GRK. 0037629, GUA. 0002095, HOL. 0151523, IND. 0116210, ISR. 0030117, ITL. 0851651, JAM. 0002094, JAP. 0655407, LXB. 0056196, MEX. 0104566, NZL. 0164356, PLP. 0007690, PNM. 0002083, PRU. 0009495, PTG. 0049748, SPN. 0354685, STZ. 0519737, SWD. 0357071, TIW. 0004940, TRD. 0000058, TRK. 0015606, URG. 0009287, VZL. 0032392.

3,609,082.—ELECTROSTATIC DEV PARTICLS CONTAING RESIN, COLORANT, METAL SALT AND PHTHALATE. SEPT. 28, 1971. ARG. 0165457, BAH. 0000094, BOL. 3389B, CAN. 0902985, CHL. 0023567, CLB. 0017680, DOR. 0001462, ECD. 0000168, ELS. 0001065, JAM. 0001897, MEX. 0100808, PNM. 0002016, PRU. 0009862, TRK. 0015594, URG. 0009288.

3,635,704.—IMAGING SYSTEM. JAN. 18, 1972. ALB. 0004133, ARG. 0176978, ATR. 0303521, AUS. 0440759, BEL. 0727560, BRA. 0088093, BUR. 0000042, CAM. 0000463, CAN. 0867697, CHL. 0026254, COR. 000949A, DNK. 0131403, EGR. 0078899, EIR. 0032632, FRA. 6902174, GNR. 0000042, GRB. 1259514, GRK. 0039240, IND. 0119583, ISR. 0031503, ITL. 0871510, LAS. 0000199, LIB. 00P7269, LXB. 0057849, MEX. 0106332, MLG. 0003056, MLW. 00MW869, MNC. 8156975, MRC. 0014724, NZL. 0155208, PAK. 0120859, PLP. 0008511, PNM. 0001676, PRU. 0010443, PTG. 0051063, RHD. 4169529, RMN. 0055464, SAF. 0069995, SPN. 0363127, STZ. 0513431, SWD. 0342921, SYA. 0002477, TGR. 0000551, TIW. 0005257, UAR. 0009525, USR. 0396887, VTM. 0001805, VZL. 0023744, ZMB. 0186974.

3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.

3,653,893.—IMAGING SYSTEM. APR. 4, 1972.

3,655,374.—IMAGING PROCESS EMPLOYING NOVEL SOLID DEVELOPER MATERIAL. APR. 11, 1972.

3,681,107.—DEVELOPMENT OF ELECTROSTATOGRAPHIC IMAGES. AUG. 1, 1972.

3,748,127.—TREATMENT OF REUSABLE PHOTOCONDUCTIVE SURFACES WITH LEWIS ACIDS OR BASES. JULY 24, 1973.

3,820,778.—VACUUM STRIPPING ROLL WITH ROTARY PICKUP SLOTS. JUNE 28, 1974. CAN. 1010081, GRB. 1430856.

3,856,692.—LIQUID ELECTROSTOGRAPHIC DEVELOPER COMPOSITIONS. DEC. 24, 1974. CAN. 0940361, GRB. 1332674.

3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924, SPN. 0435074.

3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

3,948,654.—ELECTROSTATOGRAPHIC PROCESS. APR. 6, 1976.

3,983,045.—THREE COMPONENT DEVELOPER COMPOSITION. SEPT. 28, 1976. ARG. 0194232, ATR. 0334199, AUS. 0462045, BEL. 0789987, CHL. 0027625, FRA. 7236617, GRB. 1402009, ITL. 0968815, MEX. 0125231, NZL. 0168638, PNM. 0002796, SAF. 0727225, SPN. 0407564, STZ. 0028096, SWD. 7213035, TIW. 0007666, VZL. 0012802.

4,002,570.—ELECTROPHOTOGRAPHIC DEVELOPER WITH POLYVINYLLIDENE FLUORIDE ADDITIVE. JAN. 11, 1977.

4,072,521.—AMIDES OF W AND CIS ALKENOIC ACIDS IN IMAGING PROCESS AND ELEMENT. FEB. 7, 1978.

4,073,649.—DI CARBOXYLIC ACID BIS AMIDES AND IMPROVED IMAGING PROCESS. FEB. 14, 1978.

4,076,641.—W- AND CIS ALKENOIC ACID AMIDES IN ELECTROSTATOGRAPHIC DEVELOPERS. FEB. 28, 1978.

4,099,968.—DICARBOXYLIC ACID BIS-AMIDES IN ELECTROSTATIC IMAGING COMPOSITIONS AND PROCESSES.

4,147,541.—ELECTROSTATIC IMAGING MEMBER WITH ACID LUBRICANT. APR. 3, 1979. AUS. 467835. BEL. 802879. CAN. 995963. FRA. 7328588. GRB. 1437041. ITL. 991465. SPN. 417382. USR. 637099.

Class 5N 2

3,844,815.—FORON YELLOW AS A TONER COLORANT. OCT. 29, 1974. BEL. 808754, CAN. 1003264, FRA. 7345058, ITL. 1000870.

4,078,930.—DEVELOPER COMPOSITIONS COMPRISING TONER AND CARRIER. MAR. 14, 1978. FRA. 763634.

Class 5N 2A

3,723,114.—THERMOSETTING ELCTRSTGRPHC DVLPR OF CARRIER/PREPOLYMER OF DIALLYL PHTHALATE ISOPHTHALATE AND MXTR. MAR. 27, 1973. ARG. 0185089, BEL. 0762507, CAN. 0970195, FRA. 7104349, GRB. 1344197, ITL. 0918244, MEX. 0122234.

3,806,339.—LIQUID DEVELOPER COMPOSITION. APR. 23, 1974.

3,900,800.—HIGH VOLTAGE AMPLIFIER. AUG. 19, 1975.

3,903,320.—ELECTROSTATOGRAPHIC DEVELOPMENT METHOD FOR PRESSURE FIXABLE TONERS. SEPT. 2, 1975.

3,909,259.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS UTILIZING SPECIFIC CARRIER-TOWER COMBINATIONS. SEPT. 30, 1975. CAN. 1005678, FRA. 7345057, GRB. 1435218.

3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.

3,965,021.—ELECTROSTATOGRAPHIC DEVELOPMENT-POLYBLEND TONERS. JUNE 22, 1976.

3,967,962.—DEVELOPING WITH TONER POLYMER HAVING CRYSTALLINE AND AMORPHOUS SEGMENTS. JULY 6, 1976.

3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

4,013,572.—HYBRID FIX SYSTEM INCORPORATING PHOTOGRADABLE POLYMERS. MAR. 22, 1977.

4,049,447.—IMAGING SYSTEM. SEPT. 20, 1977. ARG. 195092, AUS. 468938, BEL 791376, CAN. 986768, FRA

7239133, GRB. 1411446, ITL. 972536, MEX. 131270, SPN. 409973, STZ. 28528, VZL. 33138.

4,104,066.—COLD PRESSURE FIX TONERS FROM POLYCAPROLACTONE. AUG. 1, 1978.

4,186,003.—HYBRID FIX SYSTEM INCORPORATING PHOTODEGRADABLE POLYMERS. JAN. 29, 1980.

Class 5N 2A 1

RE.25,136.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR-RE OF 2,940,934-D432. MAR. 13, 1962.

3,079,342.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR. FEB. 26, 1963. ARG. 0157131, CAN. 0726134, GUA. 0001817.

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 5N 2A 2

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 5N 2B

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,591,503.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 6, 1971. ARG. 0172143, ATR. 0287491, AUS. 0418556, BEL. 0713751, CAN. 0879020, CHL. 0024256, CLB. 0017933, FRA. 1560849, GRB. 1225980, GRK. 0038397, IND. 0115457, ITL. 0833710, LXB. 0055904, MEX. 0111625, NOR. 0128297, NZL. 0152196, PLP. 0008847, PRU. 0009319, PTG. 0049455, SAF. 0682386, SPN. 0352810, STZ. 0508903, SWD. 0333868, URG. 0009139, VZL. 0023688.

3,595,794.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 27, 1971. ARG. 0169109, ATR. 0290986, AUS. 0418156, BEL. 0713752, CAN. 0879021, CHL. 0024482, FRA. 1582855, GRB. 1227471, IND. 0115458, ITL. 0883043, LXB. 0055894, MEX. 0115899, NOR. 0128036, NZL. 0152195, PLP. 0007966, PRU. 0009335, PTG. 0049154, SAF. 0682358, SPN. 0352811, STZ. 0505410, SWD. 0331633, URG. 0009283, VZL. 0023687.

3,627,522.—DEVELOPER COMPOSITION AND METHOD OF USE. DEC. 14, 1971.

3,672,928.—ELECTROSTATOGRAPHIC DEVELOPERS HAVING CARRIERS COMPRISING POLYSTER COATED CORES. JUNE 27, 1972. ARG. 0184669, BEL. 0762415, CAN. 0941209, FRA. 7103845, GRB. 1344365, ITL. 0918191, JAP. 0764506.

3,704,066.—REFLEX ESPOSURE MEDIUM. NOV. 28, 1972.

3,725,283.—ELECTROSTATOGRAPHIC DEVELOPER CONTAINING UNCOATED GLASS CERAMIC CARRIER PARTICLES. APR. 3, 1973. BEL. 0777720, CAN. 0973745, FRA. 7201006, GRB. 1376457, ITL. 0946358.

3,767,578.—CARRIER MATERIAL FOR ELECTROSTATOGRAPHIC. OCT. 23, 1973. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.

3,847,604.—ELECTROSTATIC IMAGING PROCESS USING MODULAR CARRIERS. NOV. 12, 1974. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.

3,849,127.—AN ELECTROSTATOGRAPHIC PROCESS IN WHICH COATED CARRIER PARTICLES ARE USED. NOV. 19, 1974.

3,857,792.—ELECTROSTATIC DEVELOPER MIXTURE WITH A COATED CARRIER. DEC. 31, 1974.

3,914,181.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURES COMPRISING FERRITE CARRIER BEADS. OCT. 21, 1975. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,923,503.—ELECTROSTATIC LATEN IMAGE DEVELOPMENT EMPLOYING STEEL CARRIER PARTICLES. DEC. 2, 1975. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.

3,939,086.—HIGHLY CLASSIFIED OXIDIZED DEVELOPER MATERIAL. FEB. 17, 1976. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.

3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

4,018,601.—ELECTROSTATOGRAPHIC MAGNETIC BRUSH IMAGING PROCESS EMPLOYING CARRIER BEADS COMPRISING HIGH NICK. APR. 19, 1977.

4,051,077.—NON FILMING DUAL ADDITIVE DEVELOPER. SEPT. 27, 1977. AUS. 487989, BEL. 825924, FRA. 7505307, GRB. 1494360, SPN. 435074.

4,065,305.—XEROGRAPHIC DEVELOPER. DEC. 27, 1977.

4,206,065.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITIONS USING TERPOLYMER COATED CARRIER. JUNE 3, 1980.

Class 5N 3

4,185,916.—COMPOSITE DEVELOPER PARTICLES AND APPARATUS FOR USING SAME. JAN. 29, 1980.

Class 5N 4

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, BRA. 6790950, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041, MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.

3,526,533.—COATED CARRIER PARTICLES. SEPT. 1, 1970. ARG. 0161341, AUS. 0418867, BEL. 0702404, CAN. 0878413, FRA. 1534184, GRB. 1205051, ITL. 0826203, JAP. 0578401, MEX. 0120334, NOR. 0122818, SPN. 0343903, STZ. 0486054, SWD. 0308987, VZL. 0032393.

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,713,819.—XEROGRAPHIC IMAGING AND DEVELOPMENT USING METAL OXIDE CARRIER PART. JAN. 30, 1973.

3,730,707.—METHOD OF DEVELOPING LATENT IMAGES. MAY 1, 1973.

3,752,666.—ELECTROSTATIC IMAGING PROCESS USING CARRIER BEADS CONTAINING CONDUCTIVE PARTICLES. AUG. 14, 1973.

3,833,366.—CARRIER COMPOSITIONS. SEPT. 3, 1974. BEL. 0748633, CAN. 0904641, FRA. 7012584, GRB. 1319787, ITL. 0899337, JAP. 0709043.

3,839,029.—ELECTROSTATOGRAPHIC DEVELOPMENT WITH FERRITE DEVELOPER MATERIALS. OCT. 1, 1974. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,849,182.—HIGHLY SHAPE-CLASSIFIED OXIDIZED LOW CARBON HYPEREUTECTOID ELECTROSTATOGRAPHIC STEEL CARRIER PA. NOV. 19, 1974. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,850,663.—CELLULOSE COATED CARRIERS. NOV. 26, 1974. ARG. 0183677, AUS. 0458322, BEL. 0763987, CAN. 0941210, EGR. 0091603, FRA. 7108585, GRB. 1345027, ITL. 0922292, MEX. 0120027, PNM. 0002440, SAF. 0711547, STZ. 0557050, SWD. 0359940, TIW. 0008177, VZL. 0032931.

3,850,676.—COATED CARRIER PARTICLES FOR ELECTROSTATOGRAPHIC DEVELOPMENT. NOV. 26, 1974.

3,900,587.—IMAGING PROCESS EMPLOYING TREATED CARRIERS PARTICLES. AUG. 19, 1975.

3,903,320.—ELECTROSTATOGRAPHIC DEVELOPMENT METHOD FOR PRESSURE FIXABLE TONERS. SEPT. 2, 1975.
3,916,064.—DEVELOPER MATERIAL. OCT. 28, 1975.
3,916,065.—ELECTROSTATOGRAPHIC CARRIER PARTICLES. OCT. 28, 1975.
3,929,657.—STOICHIOMETRIC FERRITE CARRIERS. DEC. 30, 1975. BEL. 0819535.
3,945,823.—ELECTROSTATOGRAPHIC REVERSAL DEVELOPMENT WITH DEVELOPER COMPRISING POLY(P-XYLYLENE) COATED CARR. MAR. 23, 1976. BEL. 0807597, CAN. 1003262, GRB. 1453595, MEX. 0133543, SPN. 0420696.
3,947,371.—DEVELOPER MATERIAL WITH POLYPXYLYLENE-COATED CARRIER. MAR. 30, 1976. BEL. 0807597, CAN. 1003262, GRB. 1453595, MEX. 0133543, SPN. 0420696.
3,989,648.—IMAGING SYSTEM. NOV. 2, 1976. CAN. 1007923.
3,996,392.—HUMIDITY-INSENSIVE FERRITE DEVELOPER MATERIALS. DEC. 7, 1976. BEL. 0847571.
4,007,293.—MECHANICALLY VIABLE DEVELOPER MATERIALS. FEB. 8, 1977.
4.019,903.—ELECTROSTATIC DEVELOPMENT. APR. 26, 1977. BEL. 0777715, CAN. 0973746, FRA. 7201001, GRB. 1376456, ITL. 0946359.
4,035,520.—IMAGING SYSTEMS. JULY 12, 1977.
4,039,331.—CARRIER BEAD COATING COMPOSITIONS. AUG. 2, 1977.
4,040,969.—HIGH SURFACE AREA CARRIER. AUG. 9, 1977. BEL. 829639, GRB. 1497732, SPN. 438084.
4,042,517.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE CONTAINING A THERMOSET ACRYLIC RESIN COATED CARRIER. AUG. 16, 1977.
4,042,518.—STOICHIOMETRIC FERRITE CARRIERS. AUG. 16, 1977. BEL. 819535, CAN. 1033978, FRA. 7429829, GRB. 1468841, SPN. 429670.
4,043,929.—ELECTROSTATOGRAPHIC CARRIER COMPOSITION. AUG. 23, 1977.
4,053,310.—DURABLE CARRIER COATING COMPOSITIONS COMPRISING POLYSULFONE. OCT. 11, 1978.
4,057,426.—MAGNETIC TONER WITH A COATED CARRIER. NOV. 8, 1977.
4,058,397.—YELLOW DEVELOPER EMPLOYING A COATED CARRIER. NOV. 15, 1978.
4,065,585.—RENEWABLE CHOW FUSER COATING. DEC. 27, 1977. GRB. 1490252.
4,066,563.—COPPER-TETRA-4-(OCTADECYLSULFONOMIDO) PHTHALOCYANINE ELECTROPHOTOGRAPHIC CARRIER. JAN. 3, 1978.
4,073,965.—YELLOW DEVELOPER EMPLOYING A COATED CARRIER AND IMAGING PROCESS USING SAME. FEB. 14, 1978.
4,076,893.—TRIBO MODIFIED CARRIER MATERIALS VIA ACYLATION. FEB. 28, 1978.
4,078,926.—IMAGING METHOD UTILIZING FUNCTIONALIZED CARRIER MATERIALS. MAR. 14, 1978.
4,079,166.—AMINOLYZED CARRIER COATINGS. MAR. 14, 1978.
4,092,163.—IMAGING PROCESS UTILIZING SILYLATED COATED CARRIER. MAY 30, 1978.
4,094,803.—DEVELOPER COMPOSITION COMPRISING AMINOLYZED COATED CARRIER. JUNE 13, 1978.
4,104,066.—COLD PRESSURE FIX TONERS FROM POLYCAPROLACTONE. AUG. 1, 1978.
4,122,024.—CLASSIFIED TONER MATERIALS. OCT. 24, 1978. BEL. 829719. CAN. 1043149. FRA. 7516758. GRB. 1497731.
4,124,385.—MAGNETIC GLASS CARRIER MATERIALS. NOV. 7, 1978.
4,124,735.—MAGNETIC GLASS CARRIER MATERIALS. NOV. 7, 1978.
4,125,667.—HIGH SURFACE AREA FERROMAGNETIC CARRIER MATERIALS. NOV. 14, 1978. BEL. 829639. CAN. 1041344. FRA. 7516181. GRB. 1497732. SPN. 438084. SWD. 75060434. USR. 623532.
4,126,437.—MAGNETIC GLASS CARRIER MATERIALS. NOV. 21, 1978.
4,126,454.—IMAGING PROCESS UTILIZING HIGH SURFACE AREA CARRIER MATERIALS. NOV. 21, 1978.
4,126,458.—INORGANIC REVERSAL CARRIER COATINGS. NOV. 21, 1978.
4,126,566.—ELECTROSTATIC DEVELOPER MATERIAL. NOV. 21, 1978. CAN. 1055761. GRB. 1494392.
4,147,540.—COLOR ELECTROPHOTOGRAPHIC DEVELOPER SYSTEM EMPLOYING ONE CARRIER HAVING A COATING OF RESIN. APR. 3, 1979. FRA. 7629316. GRB. 1526875.
4,152,279.—TRIBOELECTRIC MODIFIED CARRIER FOR ELECTROSTATOGRAHIC DEVELOPER. MAY 1, 1979.
4,156,607.—CARRIER COATED WITH ACYL MODIFIED STYRENE COPOLYMER, USED IN ELECTROSTATIC IMAGING PROCESS. MAY 29, 1979.
4,179,388.—DEVELOPER MATERIAL. DEC. 18, 1979.

Class 5N 5

3,788,994.—PRESSURE FIXABLE ELECTROSTATOGRAPHIC TONER. JAN. 29, 1974. ARG. 0200575, BEL. 0793247, CAN. 0985943, FRA. 7244381, GRB. 1406687, ITL. 0973323, SPN. 0410212, STZ. 0028529, VZL. 0032608.
3,804,764.—ELECTROSTATOGRAPHIC PRESSURE SENSITIVE POLYMERIC TONER. APR. 16, 1974. ARG. 0196320, AUS. 0464392, BEL. 0793554, CAN. 1011149, FRA. 7246575, GRB. 1417409, ITL. 0973325, SPN. 0410211, STZ. 0028568.
3,853,778.—TONER COMPOSITION EMPLOYING POLYMER WITH SIDE CHAIN CRYSTALLINITY. DEC. 10, 1974. AUS. 0465653, BEL. 0793639, CAN. 0998869, FRA. 7246888, GRB. 1423291, ITL. 0973330, SPN. 0410267, SWD. 7300003.
3,893,932.—PRESSURE FIXABLE TONER. JULY 8, 1975.
3,893,934.—SOLID DEVELOPER FOR ELECTROSTATIC LATENT IMAGES. JULY 8, 1975.
4,002,776.—IMAGING PROCESS EMPLOYING TONER PARTICLES CONTAINING ARYLSULPONAMIDE FORMALDEHYDE ADDUCT. JAN. 11, 1977.
4,027,048.—ELECTROSTRATOGRAPHIC DEVELOPMENT. ARG. 0196318, AUS. 0467046, BEL. 0792115, CAN. 1001884, FRA. 7239134, ITL. 0973326, MEX. 0128788, SPN. 0410205, STZ. 0028567, VZL. 0033139.
4,049,447.—IMAGING SYSTEM. SEPT. 20, 1977. ARG. 195092, AUS. 468938, BEL. 791376, CAN. 986768, FRA. 7239133, GRB. 1411446, ITL. 972536, MEX. 131270, SPN. 409973, STZ. 28528, VZL. 33138.
4,070,186.—TRIBO MODIFIED TONER MATERIALS VIA SILYLATION AND ELECTROSTATOGRAPHIC IMAGING PROCESS. JAN. 24, 1978.
4,070,296.—TRIBOELECTRICALLY CONTROLLED COVAL- ENTLY DYED TONER MATERIALS. JAN. 24, 1978.
4,078,931.—AMINOLYZED TONER COMPOSITIONS AND IMAGING PROCESS USING SAME. MAR. 14, 1978.
4,079,166.—AMINOLYZED CARRIER COATINGS. MAR. 14, 1978.
4,104,066.—COLD PRESSURE FIX TONERS FROM POLYCAPROLACTONE. AUG. 1, 1978.
4,113482.—IMAGING COMPOSITIONS. SEPT. 12, 1978. CAN. 978790. GRB. 1418292.
4,134,760.—TRIBO MODIFIED TONER MATERIALS VIA ACYLATION. JAN. 16, 1979. GRB. 1525703.
4,135,925.—METHODS OF CHANGING COLOR BY IMAGE DISRUPTION. JAN. 23, 1979. CAN. 978790. GRB. 1418292.
4,139,483.—ELECTROSTATOGRAPHIC TONER COMPOSITION CONTAINING SURFACTANT. FEB. 13, 1979.
4,175,962.—ELECTROSTATOGRAPHIC TONER MATERIAL. NOV. 27, 1979.
4,198,477.—METHOD OF USING ELECTROSTATOGRAPHIC TONER COMPOSITION WITH SURFACTANT. APR. 15, 1980. SPN. 467191.

Class 5N 5A

3,729,419.—LIQUID DEVELOPER. APR. 24, 1973.
3,804,619.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS. APR. 16, 1974. CAN. 1005678, FRA. 7345057, GRB. 1435218.
3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.
3,841,893.—CHARGE CONTROL AGENTS FOR LIQUID DEVELOPERS. OCT. 15, 1974.
3,897,249.—TONERS FOR PHTHALOCYANINE PHOTORECEPTORS. JULY 29, 1975.
3,900,800.—HIGH VOLTAGE AMPLIFIER. AUG. 19, 1975.
3,909,259.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS UTILIZING SPECIFIC CARRIER-TONER COMBINATIONS. SEPT. 30, 1975. CAN. 1005678, FRA. 7345057, GRB. 1435218.
4,035,310.—YELLOW DEVELOPER. JULY 12, 1977.
4,052,207.—ELECTROSTATOGRAPHIC IMAGING PROCESS. OCT. 4, 1977. SPN. 450203.

Class 5N 5B

4,187,194.—ENCAPSULATION PROCESS. FEB. 5, 1980. BEL. 793327, CAN. 1008314, GRB. 1423292, SPN 410265.

Class 5N 6

3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973.

3,908,046.—P-XYLYENE VAPOR PHASE POLYMERIZATION COATING OF ELECTROSTATOGRAPHIC PARTICLES. SEPT. 23, 1975.
3,986,968.—MILLED AND POLAR SOLVENT EXTRACTED LIQUID DEVELOPER. OCT. 19, 1976.

Class 5N 6A

3,507,686.—METHOD OF COATING CARRIER BEADS. APR. 21, 1970. CAN. 0872190, GRB. 1239621, JAP. 0675782.
3,658,500.—METHOD OF PRODUCING GLASS BEADS FOR ELECTROSTATOGRAPHIC DEVELOPERS. APR. 25, 1972. CAN. 0916536, GRB. 1331485.
3,685,113.—DEVELOPER SYSTEM. AUG. 22, 1972. ARG. 0183679, BEL. 0764635, CAN. 0941211, FRA. 7110751, GRB. 1347568, ITL. 0922132, MEX. 0122432.
3,764,310.—METHOD OF PRODUCING ELECTROSTATOGRAPHIC DEVELOPER. OCT. 9, 1973.
3,789,796.—APPARATUS FOR PRODUCING DEVELOPER MATERIALS. FEB. 5, 1974.
3,989,435.—APPARATUS FOR FABRICATING SPHERICALLY SHAPED PARTICLES OF SMALL DIAMETER. NOV. 2, 1976.
4,019,842.—APPARATUS FOR FORMING MAGNETITE ELECTROSTATOGRAPHIC CARRIERS. APR. 26, 1977.
4,075,391.—PRODUCTION OF FERRITE ELECTROSTATOGRAPHIC CARRIER MATERIAL HAVING IMPROVED PROPERTIES. FEB. 21, 1978. BEL. 847571, FRA. 7632899, SPN. 452858.
4,076,640.—PREPARATION OF SPHEROIDIZED PARTICLES. FEB. 28, 1978. SPN. 445496.
4,129,136.—REJUVENATING ELECTROSTATOGRAPHIC CARRIER PARTICLES. DEC. 12, 1978.
4,209,550.—COATING CARRIER MATERIALS BY ELECTROSTATIC PROCESS. JUNE 24, 1980.

Class 5N 6B

3,326,848.—SPRAY DRIED LATEX TONERS. JUNE 20, 1967. AUS. 0409084, BEL. 0666056, CAN. 0866260, FRA. 1451366, GRB. 1115653, ITL. 0717377, MEX. 0088140, SWD. 0340046.
3,338,991.—METHOD OF FORMING ELECTROSTATIC TONER PARTICLES. AUG. 29, 1967. FRA. 1450642, GRB. 1115634, HOL. 0142251, ITL. 0717378, JAP. 0539572.
3,502,582.—IMAGING SYSTEMS. MAR. 24, 1970. ARG. 0171952, BEL. 0726571, CAN. 0873934, FRA. 1569382, GRB. 1237095, ITL. 0835554, MEX. 0100704, VZL. 0032414.
3,740,334.—PROCESS OF PREPARING SOLID DEVELOPERS FOR ELECTROSTATIC LATENT IMAGES. JUNE 19, 1973.
3,830,750.—ENCPSLING SBSTNLY SLUBL PRTN OF CORE MATL IN SBSTNLY SLBLE SHELL MATL OF DFRNT SOLUBLTY. AUG. 20, 1974. AUS. 0466018, BEL. 0793246, CAN. 0983328, GRB. 1411954, ITL. 0973317, SPN. 0410224, STZ. 0028527.
3,893,933.—PROCESS FOR PRODUCING ENCAPSULATED TONER COMPOSITION. JULY 8, 1975.
3,968,044.—MILLED LIQUID DEVELOPER. JULY 6, 1976.
3,990,797.—DIFFRACTION MONITORING OF RAYLEIGH MODE JETS. NOV. 9, 1976.
4,016,099.—METHOD OF FORMING ENCAPSULATED TONER PARTICLES. APR. 5, 1977.
4,097,404.—PROCESS FOR PROVIDING ENCAPSULATED TONER COMPOSITION-MICROENCAPSULATION. JUNE 27, 1978.
4,187,194.—ENCAPSULATION PROCESS. FEB. 5, 1980. BEL. 793327, CAN 1008314, GRB. 1423292, SPN. 410265.

Class 5O

3,641,981.—APPARATUS FOR CONTROLLING DEVELOPER CHARGE LEVEL. FEB. 15, 1972. CAN. 0914006, GRB. 1338417.
3,654,901.—TONER RECLAIMING SYSTEM. APR. 11, 1972. ATR. 0321720, AUS. 0459286, BEL. 0754425, CAN. 0941881, DNK. 0130262, EGR. 0085711, FRA. 7029147, GRB. 1325455, IND. 0127847, ITL. 0901160, JAP. 1143014, NOR. 0130609, PLD. 0080951, PLP. 0008671, PTG. 0054272, SAF. 0705408, SPN. 0382437, STZ. 0513441, SWD. 0361533, TIW. 0006725, USR. 0373974.
3,664,297.—CENTRIFUGAL DEVELOPMENT APPARATUS AND METHOD. MAY 23, 1972. GRB. 1315565, JAP. 0719144.
3,809,012.—DEVELOPER SEAL. MAY 7, 1974. CAN. 0984133.
3,872,826.—DEVELOPMENT SYSTEM SEAL. MAR. 25, 1975.
3,893,415.—DEVELOPING APPARATUS. JULY 8, 1975. ARG. 0204387, BEL. 0789238, BRA. 0088405, CAN. 0991394, FRA. 7232380, GRB. 1409815, ITL. 0970948, MEX. 0128578, SPN. 0408654, STZ. 0554551, SWD. 7214863, VZL. 0033578.
3,906,899.—DEVELOPER SEAL. SEPT. 23, 1975.
3,915,121.—DEVELOPMENT APPARATUS. OCT. 28, 1975.
3,924,566.—REPRODUCTION MACHINE WITH MEANS FOR SOLIDIFYING THE RECLAIM TONER. DEC. 9, 1975.
3,982,498.—DEVELOPMENT APPARATUS. SEPT. 28, 1976. FRA. 7436713.
4,029,047.—IMPROVED TONER HANDLING SYSTEM. JUNE 14, 1977.
4,039,102.—DEVELOPER DOOR WITH USE COUNTER ON DOOR. AUG. 2, 1977.
4,041,902.—FILTER APPARATUS. AUG. 16, 1977.
4,058,086.—EMISSION CONTROLLER FOR DEVELOPMENT APPARATUS. NOV. 15, 1977.
4,088,481.—EXTENDED RANGE COLOR ELECTROPHOTOGRAPHIC METHOD BY SUPERIMPOSING A HALF-TONE IMAGE ON A LOW. MAY 9, 1978.
4,100,611.—APPARATUS FOR CONTROLLING AIRBORNE PARTICLE EMISSION. JULY 11, 1978.
4,139,296.—CROSS MIXER. FEB. 13, 1979.

Class 5P

3,649,262.—SIMULTANEOUS DEVELOPMENT-CLEANING OF SAME AREA OF AN ELECTROSTATOGRAPHIC IMAGE SUPPORT SURFACE. MAR. 14, 1972. AUS. 0445365, BEL. 0743661, CAN. 0916232, FRA. 6944511, GRB. 1296997, ITL. 0882670, USR. 0358873.
4,029,047.—IMPROVED TONER HANDLING SYSTEM. JUNE 14, 1977.

Class 6

3,753,560.—AUXILIARY SHEET FEEDER-MULTI STATION AUXILIARY PAPER FEEDER-2400. AUG. 21, 1973. AUS. 0466179, BEL. 0793641, CAN. 1000750, FRA. 7300150, GRB. 1402971, ITL. 0973328, SPN. 0410322.
3,833,790.—HEATED PRESSURE FUSING SYSTEM. SEPT. 3, 1974, FRA. 7422884.
4,111,565.—APPARATUS FOR SENSING WHEN PAPER UTILIZED IN A PRINTER HAS BEEN DEPLETED. SEPT. 5, 1978.
4,161,362.—DOCUMENT CODING. JULY 17, 1979.

Class 6A

3,104,873.—PAPER SUPPLY TRAY. SEPT. 24, 1963. CAN. 0699129, GRB. 1016553.
3,153,534.—PAPER SUPPLY TRAY. OCT. 20, 1964.
3,154,356.—PAPER CATCH TRAY. OCT. 27, 1964. CAN. 0726574, GRB. 1032952, JAP. 0497185.
3,405,635.—PAPER SUPPORT TRAY FOR REPRODUCTION MACHINES. OCT. 15, 1968.
3,406,964.—ADJUSTABLE PACK HOLDER. OCT. 22, 1968. CAN. 0848822, GER. 1270049, GRB. 1158671, JAP. 0914623.
3,415,510.—AUXILIARY SHEET FEEDER. DEC. 10, 1968. CAN. 0831412, GRB. 1235158.
3,458,187.—SHEET HOLDER. JULY 29, 1969. CAN. 0879560, GRB. 1199947.
3,599,966.—SHEET HANDLING APPARATUS. AUG. 17, 1971. CAN. 0921504, JAP. 783765.
3,601,394.—SHEET RETAINING APPARATUS. AUG. 24, 1971. ARG. 0195162, AUS. 0437722, BEL. 0752940, CAN. 0966521, CHL. 0026165, CZC. 0164276, EGR. 0085710, FRA. 7024668, GRB. 1312304, ITL. 0900198, JAP. 0803409, MEX. 0116509, PLD. 0082760, PNM. 0002170, SPN. 0381385, STZ. 0547747, SWD. 0361648, TIW. 0005745, USR. 0493985.
3,651,933.—COPY SHEET PACKAGE. MAR. 28, 1972.
3,687,448.—SHEET FEEDING APPARATUS. AUG. 29, 1972. CAN. 9782161, GRB. 1373810.
3,847,385.—SHEET CONTAINER. NOV. 12, 1974. CAN. 0991208.
3,847,388.—SHEET STACKING METHOD AND APPARATUS. NOV. 12, 1974. CAN. 0996145, FRA. 7344220, GRB. 1440489, MEX. 0134934.
3,848,988.—MOISTURE CONTROL DEVICE. NOV. 19, 1974.
3,857,558.—PAPER CASSETTE DESIGN WITH IRREGULAR BOTTOM. DEC. 31, 1974, CAN. 1010083.
3,883,133.—MOVABLE PACK ADVANCER. MAY 13, 1975.
3,907,283.—SENSING SHEETS ON A SUPPORT SURFACE. SEPT. 23, 1975.
3,921,972.—SHEET STACK RECEPTACLE. NOV. 25, 1975.
3,926,519.—CONTROL DEVICE FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. DEC. 16, 1975.

3,934,870.—SHEET FEEDING DEVICES. JAN. 27, 1976.
3,936,044.—ADJUSTABLE SHEET GUIDE. FEB. 3, 1976.
3,957,366.—SHEET FEEDING APPARATUS. MAY 18, 1976.
3,995,951.—SHEET FEEDING APPARATUS & REPRODUCING MACHINE. DEC. 7, 1976.
4,008,957.—REPRODUCTION MACHINE CONTROL. FEB. 22, 1977.
4,014,537.—AIR FLOATATION BOTTOM FEEDER. MAR. 29, 1977.
4,060,233.—CASSETTE LOADED SHEET FEEDER FOR REPRODUCTION MACHINE. NOV. 29, 1977.
4,060,234.—CARTRIDGE TRAY FOR USE IN A COPYING MACHINE. NOV. 29, 1977.
4,075,391.—PRODUCTION OF FERRITE ELECTROSTATOGRAPHIC CARRIER MATERIAL HAVING IMPROVED PROPERTIES. FEB. 21, 1978. BEL. 847571, FRA. 7632899, SPN. 452858.
4,086,007.—DUAL PURPOSE DOCUMENT AND COPY SHEET FEED CASSETTE. APR. 25, 1978.
4,190,246.—PAPER FEEDING SYSTEM. FEB. 26, 1980.
4,191,467.—DUAL MODE CATCH TRAY. MAR. 4, 1980.

Class 6A 1

3,100,111.—SHEET FEED MECHANISM. AUG. 6, 1963. ARG. 0162642, CAN. 0683564, GRB. 1032956, IND. 0096309, JAP. 0478677.
3,301,551.—SHEET FEED MECHANISM. JAN. 31, 1967. CAN. 0811029, JAP. 0639312.
3,378,254.—PACK ADVANCER. APR. 16, 1968. CAN. 0815409, GER. 1289850, GRB. 1129872, JAP. 0615872.
3,402,928.—SHEET HANDLING APPARATUS. SEPT. 24, 1968. CAN. 0871575, GRB. 1203615, JAP. 0602168.
3,558,127.—SHEET HANDLING APPARATUS. JAN. 26, 1971. ARG. 0180315, AUS. 0443480, BEL. 0741889, CAN. 0928826, FRA. 6939710, GRB. 1282910, ITL. 0878226, JAP. 0791733, MEX. 0112773, SPN. 0373541, SWD. 6915742.
3,630,517.—COUNTER STACKER. DEC. 28, 1971.
3,768,806.—BI-DIRECTIONALLY MOVABLE PLATFORM CONTROL. OCT. 30, 1973. CAN. 0992113, GRB. 1403040.
3,820,777.—ELEVATOR ASSEMBLY POSITIONING CONTROL. JUNE 28, 1974. BEL. 0802196, CAN. 0999334, GRB. 1416470.
3,898,425.—FUSING APPARATUS. AUG. 5, 1975.
4,004,127.—IMPROVED ON LINE FUSING SYSTEM. JAN. 18, 1977.
4,033,578.—STACK ELEVATING APPARATUS. MAY 7, 1977.
4,147,342.—VIBRATING TAMPER. APR. 3, 1979.

Class 6B

3,847,388.—SHEET STACKING METHOD AND APPARATUS. NOV. 12, 1974. CAN. 0996145, FRA. 7344220, GRB. 1440489, MEX. 0134934.
3,958,989.—TRANSPARENCY SUPPORT MATERIAL FOR ELECTROPHOTOGRAPHIC PROCESS. MAY 25, 1976. BEL. 0815634, CAN. 1006012.
4,043,549.—IMPACT FEEDER. AUG. 23, 1977.
4,051,285.—TEARABLE EDGE STRIP FOR PLASTIC SHEET. SEPT. 27, 1977. BEL. 815634, CAN. 1006012, FRA. 7419536, ITL. 1014700.

Class 6B 1

3,062,533.—PAPER FEED APPARATUS. NOV. 6, 1962. CAN. 0712936.
3,062,534.—SHEET FEED MECHANISM. NOV. 6, 1962. GRB. 1016700.
3,083,962.—SHEET STRIPPER. APR. 2, 1963. ARG. 0165468, CAN. 0712935, GRB. 1032958, IND. 0096311, JAP. 0484728.
3,104,872.—EDGE DRAG DEVICE. SEPT. 24, 1963. CAN. 0699594.
3,241,830.—SHEET FEED MECHANISM. MAR. 22, 1966. ATR. 0276087, AUS. 0295720, CAN. 0765301, DNK. 0126493, EIR. 0028650, GER. 1197326, GRB. 1089538, ISR. 0030228, NZL. 0148732, STZ. 0457511.
3,251,594.—SHEET FEED MECHANISM. MAY 17, 1966. AUS. 0416589, CAN. 0785164, DNK. 131.557, EIR. 0029758, GRB. 1122623, ISR. 0034134, JAP. 0499006, NOR. 0125806, SWD. 0358480.
3,276,770.—SHEET FEEDING APPARATUS. OCT. 4, 1966. CAN. 0788346, FRA. 1459041, GER. 1237587, GRB. 1055215, ITL. 0726800, JAP. 0537118.
3,288,460.—PAPER FEED MECHANISM. NOV. 29, 1966. ATR. 0300566, CAN. 0792617, GRB. 1135746, JAP. 0630911, STZ. 0509924.
3,288,461.—SHEET FEEDING APPARATUS. NOV. 29, 1966. CAN. 0856098, GER. 1249887, GRB. 1123260, JAP. 0562385.
3,300,206.—ELECTRICALLY ENERGIZED CLUTCH FOR SHEET FEED CONTROL MECHANISM. JAN. 24, 1967. CAN. 0788344, GRB. 1135745, MEX. 0112221, STZ. 0513063.
3,406,960.—PAPER HANDLING APPARATUS. OCT. 22, 1968. CAN. 0907683, GRB. 1202218.
3,425,685.—PAPER FEED MECHANISM. FEB. 4, 1969. BEL. 0708498, CAN. 0847744, FRA. 1552327, GRB. 1165279, ITL. 0819625, JAP. 0972609, MEX. 0105134.
3,469,834.—SHEET FEEDER AND SEPARATOR APPARATUS. SEPT. 30, 1969. ARG. 0168907, CAN. 0847743, CHL. 0023614, CLB. 0017683, JAM. 0001852, MEX. 0102646, PRU. 0009339, URG. 0008981, VZL. 0023673.
3,524,639.—AUTOMATIC FEEDING DEVICE. AUG. 18, 1970. CAN. 0895184, FRA. 6906418, GRB. 1254784, ITL. 0875431, JAP. 0713806.
3,537,703.—MANIFOLD SHEET SEPARATING DEVICE. NOV. 3, 1970. CAN. 0923351, GRB. 1261077.
3,556,516.—SELF-ALIGNING FEED ROLLER. JAN. 19, 1971. CAN. 0899392, GRB. 1256265.
3,565,421.—FEEDING SYSTEM. FEB. 23, 1971.
3,567,214.—SHEET FEEDING AND SEPARATING APPARATUS. MAR. 2, 1971. BEL. 0734128, CAN. 0902124, FRA. 6919122, GER. 1929105, GRB. 1263193, HOL. 0144551, ITL. 0866188, SPN. 0368173, STZ. 0501501, SWD. 6908176.
3,578,317.—SHEET CONVEYOR APPARATUS FOR AUTOMATIC COPYING MACHINE. MAY 11, 1971. ARG. 0193800, ATR. 0307233, AUS. 0446229, BEL. 0750390, CAN. 0907682, EGR. 0082423, FRA. 7017317, GRB. 1284832, ITL. 0893096, JAP. 783766, MEX. 0117916, NZL. 0160102, SPN. 0379652, STZ. 0516404, SWD. 0361952, TIW. 0006833, VZL. 0025781.
3,580,565.—SHEET FEEDING APPARATUS. MAY 25, 1971.
3,592,462.—GATED PAPER SNUBBER. JULY 13, 1971. CAN. 0923922.
3,601,389.—SHEET FEEDING APPARATUS. AUG. 24, 1971. ARG. 0184657, BEL. 0752939, CAN. 0912055, CHL. 0026164, FRA. 7024666, GRB. 1306595, GUA. 0002508, ITL. 0907152, MEX. 0114977, PNM. 0002212, TIW. 0006720, VZL. 0032784.
3,618,752.—STACK OF IMAGE RECEIVING MEMBERS. NOV. 9, 1971.
3,655,183.—SHEET FEED APPARATUS. APR. 11, 1972.
3,664,663.—PAPER CASSETTE LOADING DEVICE. MAY 23, 1972. CAN. 0951342, GRB. 1351766.
3,713,645.—SHEET SEPARATING APPARATUS. JAN. 30, 1973. CAN. 0957392.
3,727,910.—SHEET SEPARATOR APPARATUS. APR. 17, 1973. CAN. 0956660, GRB. 1391198.
3,731,915.—FEED ROLL ABRASION ROLLER. MAY 8, 1973. ARG. 0194272, BEL. 0791064, CAN. 0966518, FRA. 7239549, GRB. 1389426, ITL. 0970223.
3,768,803.—SHEET FEEDER. OCT. 30, 1973. ARG. 0197314, BEL. 0795206, CAN. 0966158, FRA. 7304740, GRB. 1413541, ITL. 0978938, MEX. 0130347, SPN. 0411475, STZ. 5656860, SWD. 7301809, VZL. 0033780.
3,773,316.—SHEET FEEDER DRIVE MECHANISM. NOV. 20, 1973. CAN. 0994376, GRB. 1424580.
3,861,670.—SHEET FEEDING APPARATUS. JAN. 21, 1975. CAN. 1010080, GRB. 1435762.
3,866,901.—REVERSE BUCKLE FEEDER. FEB. 18, 1975, CAN. 1008893.
3,873,084.—PAPER FEEDER. MAR. 25, 1975.
3,893,663.—REVERSE BUCKLE SHEET FEEDING APPARATUS. JULY 8, 1975, CAN. 1005090, GRB. 1447909, MEX. 0135280.
3,895,791.—BOTTOM SHEET FEEDER USING SEPARATION BELT AND RETARD PAD. JULY 22, 1975, CAN. 1007255, GRB. 1443089.
3,934,869.—SHEET SEPARATING AND FEEDING APPARATUS. JAN. 27, 1976. GER. 7439833.
3,936,046.—FRONT AND SIDE SHEET REGISTERING APPARATUS. FEB. 3, 1976.
3,941,373.—FLOATING GATE SHEET SEPARATOR. MAR. 2, 1976.
3,947,018.—UNIVERSAL FEEDER-STACKER. MAR. 30, 1976. BEL. 0836262.
3,949,979.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. APR. 13, 1976.
3,966,189.—TOGGLING RETARD PAD. JUNE 29, 1976.
3,995,952.—SHEET FEEDING APPARATUS. DEC. 7, 1976.
4,023,792.—SHEET FEEDING APPARATUS. MAY 17, 1977. ARG. 0195877, AUS. 0462397, BEL. 0792370, CAN. 0978556, FRA. 7239132, GRB. 1410799, ITL. 0990513, MEX. 0128127, SPN. 0437744, STZ. 0546689.
4,030,725.—PAPER TRAY FOR COPYING MACHINES. JUNE 21, 1977.
4,043,549.—IMPACT FEEDER. AUG. 23, 1977.
4,053,152.—SHEET FEEDING DEVICE. OCT. 11, 1977.
4,058,305.—PAPER FEEDING DEVICE. NOV. 15, 1977.

4,166,614.—JOGGING AND NORMAL FORCE FOR SHEET FEEDING. SEPT. 4, 1979. BEL. 869792.
4,189,138.—PAPER FEEDER. FEB. 19, 1980. CAN. 1077980.
4,192,497.—COMPOSITION FOR THE SURFACE OF SHEET SEPARATING DEVICE. MAR. 11, 1980. CAN. 1043828, GRB. 1511502.

Class 6B 2

3,378,255.—PAPER HANDLING APPARATUS. APR. 16, 1968. CAN. 0836939, FRA. 1527333, GRB. 1181271, ITL. 0804517, JAP. 1052342, MEX. 0099951.
3,547,431.—PNEUMATIC CUT SHEET FEEDER. DEC. 15, 1970.
4,043,549.—IMPACT FEEDER. AUG. 23, 1977.

Class 6C

3,120,446.—METHOD OF TRANSFERRING A DEVELOPED SOLID PARTICULATE IMAGE. FEB. 4, 1964.
3,519,124.—ARTICLE TO FACILITATE FEEDING OF IMAGE RECEIVING SHEETS. JULY 7, 1970. CAN. 0941879, FRA. 1568821, GRB. 1216347, ITL. 0870563.
3,589,809.—FEEDING SYSTEM. JUNE 29, 1971.
3,630,514.—SHEET FEEDING APPARATUS. DEC. 28, 1971. ARG. 0186214, AUS. 0452075, BEL. 0751309, CAN. 0921948, EGR. 0090063, FRA. 7019460, GRB. 1253503, ITL. 0893690, JAP. 783764, MEX. 0117507, SPN. 0380270, STZ. 0511759, SWD. 0363621, TIW. 0006836, USR. 0466680.
3,645,615.—COPYING APPARATUS. FEB. 29, 1972. ARG. 0185529, AUS. 0445849, BEL. 0752941, CAN. 0925927, CHL. 0025888, FRA. 7024670, GRB. 1312305, GUA. 0002324, ITL. 0900200, MEX. 0115165, PNM. 0002260, SPN. 0381387, STZ. 0525778, SWD. 7009063, TIW. 0007163, USR. 0535033, VZL. 0032783.
3,902,421.—METHOD FOR FORMING A PICTURE IMAGE. SEPT. 2, 1975.
4,190,354.—COPIER JOB RECOVERY SYSTEM. FEB. 26, 1980.

Class 6D

3,071,370.—SHEET FEEDING APPARATUS. JAN. 1, 1963. CAN. 0683900, GRB. 0999435.
3,071,374.—PAPER GRIPPER MECHANISM. JAN. 1, 1963.
3,078,770.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 26, 1963. CAN. 0701741.
3,095,194.—SHEET GUIDING APPARATUS. JUNE 25, 1963. CAN. 0713451, FRA. 1355072, GER. 1174334, GRB. 1026214, ITL. 0688494, JAP. 0457839.
3,100,109.—PAPER GRIPPER MECHANISM. AUG. 6, 1963. GRB. 1015634, JAP. 0471314.
3,100,112.—DOCUMENT FEED MECHANISM. AUG. 6, 1963. GRB. 1015635, JAP. 0478676.
3,137,495.—SHEET FEED MECHANISM. JUNE 16, 1964. GRB. 1015636, JAP. 0471315.
3,179,407.—SHEET FEED GUIDE. APR. 20, 1965. CAN. 0719606, FRA. 1355071, GER. 1179562, GRB. 1023036, ITL. 0688495, JAP. 0457850.
3,190,643.—SHEET GUIDING APPARATUS. JUNE 22, 1965.
3,199,866.—SHEET FEED MECHANISM. AUG. 10, 1965. CAN. 0742591, GRB. 1043646.
3,206,193.—XEROGRAPHIC REPRODUCING MACHINE CONTROL. SEPT. 14, 1965.
3,239,215.—DOCUMENT FEED MECHANISM. MAR. 8, 1966. CAN. 0741548, GRB. 1052820, JAP. 0497188.
3,239,220.—DOCUMENT CONVEYOR. MAR. 8, 1966. CAN. 0770495, FRA. 1434188, GRB. 1094188, ITL. 0742434.
3,245,311.—DOCUMENT CONVEYOR. APR. 12, 1966.
3,256,009.—SHEET REGISTRATION DEVICE. JUNE 14, 1966. CAN. 0777667.
3,281,144.—SHEET REGISTRATION DEVICE. OCT. 25, 1966. ARG. 0152212, AUS. 0423243, CAN. 0803888, DNK. 0122597, EIR. 0029757, GRB. 1122621, ISR. 0034133, JAP. 0512650, MEX. 0078899, NOR. 0126565, SWD. 0358034.
3,357,347.—PAPER FEEDING AND BREAKING MEANS FOR ELECTROGRAPHIC DEVICE. DEC. 12, 1967. CAN. 0863520, GRB. 1182684, JAP. 0582500.
3,374,732.—SELF-ALIGNING COPY DRUM STRIPOUT MECHANISM FOR REPRODUCTION MACH. MAR. 26, 1968.
3,375,781.—REGISTRATION MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,389,907.—DOCUMENT HANDLING APPARATUS. JUNE 25, 1968.
3,411,771.—SHEET TRANSPORT. NOV. 19, 1968. ARG. 0177552, ATR. 0284168, AUS. 0455833, CAN. 0869421, CHL. 0023101, CLB. 0016775, DNK. 0126100, EIR. 0031308, FIN. 0047867, GRB. 1193515, IND. 0112002, ISR. 0028520, JAP. 0604153, MEX. 0099909, NOR. 0127531, NZL. 0149790, PAK. 0119259, PLP. 0005199, PRU. 0009331, SAF. 0674988, SPN. 0344351, STZ. 0478048, SWD. 0343829, TRK. 0015345, URG. 0008858, VZL. 0026277.
3,422,756.—PAPER SUPPORT AND REGISTRATION MEANS FOR REPRODUCTION MACHINE. JAN. 21, 1969.
3,434,710.—SHEET HANDLING APPARATUS. MAR. 25, 1969. ARG. 0166613, CAN. 0830328, CHL. 0023568, CLB. 0017530, DNK. 0120163, GRB. 1206965, MEX. 0100814, PRU. 0009338, SPN. 0360895, STZ. 0502942. URG. 0008977, USR. 0433696, VZL. 0023674.
3,502,325.—CARD HANDLING APPARATUS. MAR. 24, 1970. ARG. 0168398, CAN. 0850515, CHL. 0024133, JAM. 0001890, MEX. 0105082, PRU. 0009337, URG. 0009016, VZL. 0027509.
3,509,780.—DOUBLE-ACTION ROTARY SOLENOID DRIVE MECHANISM. MAY 5, 1970.
3,517,923.—SHEET REGISTRATION APPARATUS. JUNE 30, 1970.
3,518,739.—TRACKING ROLLER. JULY 7, 1970. ARG. 0177437, AUS. 0437287, BEL. 0733662, BRA. 6908481, CAN. 0884215, FRA. 6917189, GRB. 1206750, ITL. 0865847, JAP. 0677424, MEX. 0111433, SPN. 0367807, SWD. 0356022, VZL. 0025065.
3,521,060.—METHOD FOR DETECTING MISROUTING OF TRANSPARENCIES DURING PROCESS OF IMAGING THEREON. JULY 21, 1970.
3,531,109.—SHEET MATERIAL TRANSPORT SYSTEM. SEPT. 29, 1970. ARG. 0177190, ATR. 0288161, AUS. 0446394, BEL. 0733197, CAN. 0899923, DNK. 0122717, FRA. 6916409, GER. 1925039, GRB. 1269100, ITL. 0863848, JAP. 0656986, MEX. 0110288, PNM. 0001431, SAF. 0693497, SPN. 0367408, SWD. 0355870.
3,536,320.—SHEET REGISTRATION DEVICE. OCT. 27, 1970.
3,556,511.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. ARG. 0185791, BEL. 0741891, CAN. 0905439, FRA. 6939711, GER. 1957780, GRB. 1279129, HOL. 0144227, ITL. 0878272, JAP. 0854601, MEX. 0112825.
3,556,512.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. CAN. 0905438, SWD. 6915838.
3,556,513.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. CAN. 0905437.
3,601,392.—SHEET REGISTERING APPARATUS. AUG. 24, 1971. ARG. 0190238, AUS. 0446147, BEL. 0752933, CAN. 0923512, CHL. 0025789, EGR. 0084327, FRA. 7024672, GRB. 1262444, ITL. 0900199, JAP. 0803410, MEX. 0115310, PLD. 0002183, PNM. 0002050, SPN. 0381386, STZ. 0525780, SWD. 0356375, TIW. 0007194, USR. 0406343.
3,603,680.—ULTRASONIC PAPER DETACTION. SEPT. 7, 1971. CAN. 0915715, GRB. 1331457.
3,614,221.—IMAGING SYSTEM. OCT. 19, 1971. CAN. 0930540, GRB. 1343603, JAP. 0728865.
3,622,238.—COPIER MACHINE FEEDING MULTIPLE SIZE COPY SHEETS. NOV. 23, 1971. ARG. 0194337, AUS. 0451241, CAN. 0902127, JAP. 0512383, NZL. 0160105.
3,647,207.—SHEET FEEDING MECHANISM CENTERING DEVICE. MAR. 7, 1972. CAN. 0959934, GRB. 1351765.
3,694,712.—SPEED CONTROL APPARATUS. SEPT. 26, 1972. CAN. 0976641, GRB. 1339506.
3,796,486.—PROGRAMMING CONTROL SYSTEM FOR PRINTING MACHINE. MAR. 12, 1974.
3,804,516.—FIRE DETECTING DEVICE FOR A PHOTOGRAPHIC PRINTING MACHINE. APR. 16, 1974.
3,809,475.—COPIER FUSER PROTECTOR. MAY 7, 1974. FRA. 7343567.
3,815,380.—SHAFT COUPLING APPARATUS. JUNE 11, 1974, CAN. 0994121.
3,819,266.—COPIER JAM PROTECTION. JUNE 25, 1974, CAN. 1005510.
3,845,951.—FORAMINOUS SHEET REGISTRATION SYSTEM. NOV. 5, 1974, CAN. 0999316.
3,858,777.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. JAN. 7, 1975.
3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975, CAN. 1004240.
3,876,317.—LATCH MECHANISM. APR. 8, 1975, CAN. 1005486.
3,888,579.—DIGITAL CONTROLLED DOCUMENT FEEDER. JUNE 10, 1975.
3,893,662.—SHEET FEEDING DEVICE. JULY 8, 1975.
3,902,421.—METHOD FOR FORMING A PICTURE IMAGE. SEPT. 2, 1975.
3,934,182.—SYNCHRONIZING APPARATUS. JAN. 20, 1976. CAN. 0957735, GRB. 1372568.
3,936,042.—SHEET FEEDING DEVICES. FEB. 3, 1976.
3,947,270.—REPRODUCING APPARATUS AND PROCESS FOR DUPLEX IMAGING IN A SINGLE PASS. MAR. 30, 1976.
3,948,511.—SHEET FEEDING DEVICES. APR. 6, 1976.

3,949,979.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. APR. 13, 1976
3,963,339.—SHEET FEEDING APPARATUS. JUNE 15, 1976.
3,984,098.—PNEUMATIC REGISTRATION AND CLAMPING APPARATUS. OCT. 5, 1976. BEL. 0848824.
4,003,568.—FLUID CONVEYER. JAN. 18, 1977.
4,025,187.—BUCKLE CONTROL SYSTEM. MAY 24, 1977.
4,036,421.—WEIGHTED PINCH ROLLS. JULY 19, 1977.
4,055,340.—ASSISTED PNEUMATIC TRANSPORT AND REGISTRATION APPARATUS. OCT. 25, 1977. BEL. 848823.
4,073,001.—APPARATUS FOR NEUTRALIZING AND REGISTERING AN ELECTROSTATICALLY CHARGED SHEET. FEB. 7, 1978.
4,077,519.—CURL DETECTOR AND SEPARATOR. MAR. 7, 1978.
4,090,704.—REGISTRATION STATION. MAY 23, 1978.
4,092,021.—UNFUSED IMAGE TRANSPORT. MAY 30, 1978.
4,128,327.—TRANSFER MATERIAL FEED APPARATUS FOR ELECTROPHOTOGRAPHIC COPYING MACHINES. DEC. 5, 1978.
4,134,671.—INTERSECTING OPTICAL AND COPY SHEET PATH METHOD AND APPARATUS. JAN. 16, 1979.
4,135,804.—REGISTRATION SYSTEM FOR A REPRODUCING DEVICE. JAN. 23, 1979.

Class 6D 1

RE.29,124.—SHEET TRANSPORT SYSTEM. JAN. 25, 1977. CAN. 1001104.
3,148,878.—SHEET FEED MECHANISM. SEPT. 15, 1964. CAN. 0715431, GER. 1222083, GRB. 1020933, JAP. 0481251.
3,240,486.—PAPER TRANSPORT MECHANISM. MAR. 15, 1966. CAN. 076664?.
3,275,318.—SHEET CONVEYING APPARATUS. SEPT. 27, 1966. MEX. 0085657.
3,408,633.—HIGH SPEED PRINTER SYSTEM. OCT. 29, 1968.
3,482,676.—DOCUMENT FEED BELT. DEC. 9, 1969. CAN. 0890297, GRB. 1253415.
3,642,362.—APPARATUS FOR CONVEYING SHEET MATERIAL. FEB. 15, 1972. GRB. 1307117.
3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.
3,743,403.—TRANSPORT ASSEMBLY. JULY 3, 1973. CAN. 0983305, GRB. 1417018.
3,781,004.—CONVEYING SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. DEC. 25, 1973. CAN. 1007287.
3,790,270.—REGISTRATION RESET SYSTEM. FEB. 5, 1974. GRB. 1439772, ITL. 0993064, SPN. 0418253.
3,804,507.—PROCESSING CONTROL DEVICE FOR PRINTING MACHINES. APR. 16, 1974.
3,808,658.—SNAP ROLLER. MAY 7, 1974, CAN. 1000637.
3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974, CAN. 1001104.
3,832,053.—BELT TRANSFER SYSTEM. AUG. 27, 1974.
3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.
3,854,566.—PHOTOELECTRIC TABULATING APPARATUS. DEC. 17, 1974. BEL. 0815420, CAN. 0982969, GRB. 1442450, ITL. 1012805, SWD. 7406400.
3,902,715.—SHEET REGISTRATION FOR PAPER HANDLING APPARATUS. SEPT. 2, 1975, CAN. 1003867, ITL. 0993066, SPN. 0418255.
3,918,705.—PROCESSING CONTROL DEVICE FOR PRINTING MACHINES. NOV. 11, 1975.
3,930,725.—MULTIPLE SHEET FEEDING SYSTEM FOR ELECTROSTATOGRAPHIC PRINTING MACHINES. JAN. 6, 1976. GRB. 1436457.
4,085,673.—SHEET FEEDING APPARATUS. APR. 25, 1978.
4,192,497.—COMPOSITION FOR THE SURFACE OF SHEET SEPARATING DEVICE. MAR. 11, 1980. CAN. 1043828, GRB. 1511502.

Class 6D 1E

4,171,131.—PNEUMATIC REGISTRATION APPARATUS. OCT. 16, 1979. CAN. 1059167, SAF. 6400, SPN. 452882.

Class 6D 2

3,112,819.—CLUTCH MECHANISM—914. DEC. 3, 1963. CAN. 0688810.
3,337,015.—LATCH OPERATED AND ONE WAY COIL CLUTCHES. AUG. 22, 1967. CAN. 0810494, JAP. 0914622.
3,840,100.—UNIDIRECTIONAL COUPLING APPARATUS. OCT. 8, 1974. CAN. 1006706.

Class 6E

RE29124.—SHEET TRANSPORT SYSTEM. JAN. 25, 1977. CAN. 1001104.
3,348,288.—DRUM CLAMP. OCT. 24, 1967. CAN. 0838542, GRB. 1123459.
3,357,325.—XEROGRAPHIC TRANSFER APPARATUS. DEC. 12, 1967. CAN. 0812525.
3,375,782.—PROGRAMMING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,567,213.—CONTROL APPARATUS FOR REGISTER STOPS AND GRIPPER FINGERS. MAR. 2, 1971.
3,685,898.—PAPER FLIP CONTROL APPARATUS. AUG. 22, 1972.
3,717,801.—METHODS AND APPARATUS FOR ELCLRSTCLY PRFMNG A TCKING OPERATION. FEB. 20, 1973.
3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974. CAN. 1001104.
3,841,751.—ELECTROSTATIC COLOR REPRODUCTION METHOD. OCT. 15, 1974. CAN. 0946463.
3,845,951.—FORAMINOUS SHEET REGISTRATION SYSTEM. NOV. 5, 1974. CAN. 0999316.
3,976,370.—BELT TRANSFER AND FUSING SYSTEM. AUG. 24, 1976.
3,993,124.—METH&APPRTS FOR SUSR ASSMBLY CLING IN ELCTROSTATOGRPC MACHNE-GAMMA METH&APPRTS FOR FUSER END CO. NOV. 23, 1976. BEL. 0793560, FRA. 7246728, ITL. 0973322, SWD. 7216976.
3,995,951.—SHEET FEEDING APPARATUS & REPRODUCING MACHINE. DEC. 7, 1976.
4,063,946.—ELECTROPHOTOGRAPHIC COLOR REPRODUCTION PROCESS EMPLOYING PHOTOCONDUCTIVE MATERIAL WITH DUAL. DEC. 20, 1977.
4,078,862.—APPARATUS FOR PRODUCING A COMPOSITE COPY OF AN ORIGINAL DOCUMENT ON SELECTIVELY POSITIONED. MAR. 14, 1978.
4,082,137.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING AN ELECTROSTATOGRAPHIC MACHINE. APR. 4, 1978. BEL. 793560, CAN. 1025515, FRA. 7246728, GRB. 1418306, ITL. 973322, SWD. 7216976.
4,085,794.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING IN AN ELECTROSTATOGRAPHIC MACHINE. APR. 25, 1978. BEL. 793560, CAN. 1025515, FRA. 7246728, GRB. 1418306, ITL. 973322, SWD. 7216976.
4,138,102.—AUTOMATIC DOCUMENT PROCESSING DEVICE. FEB. 6, 1979.

Class 6F

3,249,354.—MULTIPLE SHEET DETECTING DEVICE. MAY 3, 1966. CAN. 0770494.
3,281,145.—PAPER REJECT MECHANISM. OCT. 25, 1966. CAN. 0770493.
3,288,462.—APPARATUS FOR HANDLING SUPERPOSED SHEETS. NOV. 29, 1966. AUS. 0422882, CAN. 0786210, EIR. 0029759, GRB. 1122625, ISR. 0034135, JAP. 0894757, NOR. 0124531.
3,301,975.—SENSING DEVICE FOR DETECTING A SHEET ON A TRANSPORT OR DRUM. JAN. 31, 1967. CAN. 0800094, FRA. 1487581, GER. 1522699, GRB. 1077117, ITL. 0774188, JAP. 0923304.
3,360,652.—FAIL SAFE PHOTOELECTRIC SHEET SENSING MACHINE CONTROL CIRCUIT. DEC. 26, 1967. CAN. 0775268, FRA. 1455478, GER. 1522805, GRB. 1121099, ITL. 0732531, JAP. 0503244, MEX. 0078869.
3,396,965.—SENSOR GAUGE. AUG. 13, 1968. CAN. 0822218, GRB. 1152538, JAP. 0587326.
3,504,911.—VACUUM POWERED MULTIPLE DOCUMENT DETECTOR. APR. 7, 1970. CAN. 0861362, FRA. 1589986, GER. 1804476, GRB. 1241968, ITL. 0845395, JAP. 0656984.
3,593,065.—SHEET DETECTION APPARATUS. JULY 13, 1971. CAN. 0923544, CZC. 0151559, EGR. 0100567, GRB. 1322794, JAP. 1162030, USR. 0365085.
3,614,419.—MULTIPLE SHEET DETECTION SYSTEM. OCT. 19, 1971. ARG. 0186441, BEL. 0765366, CAN. 0930052, FRA. 7113404, GRB. 1342656, ITL. 0922694, MEX. 0119754, VZL. 0021933.
3,627,311.—SHEET SENSOR. DEC. 14, 1971. CAN. 0871371, GRB. 1322258.
3,628,785.—GRIP FORCE DETECTION APPARATUS. DEC. 21, 1971. ARG. 0185946, AUS. 0455882, BEL.

0760750, CAN. 0923158, FRA. 7047695, GRB. 1340206, ITL. 0913997, MEX. 0117505, STZ. 0518227, SWD. 7017384, VZL. 0032788.

3,650,616.—MISPUFF DETECTOR. MAR. 21, 1972. BEL. 0778739, CAN. 0954181, FRA. 7203548, GRB. 1374923, ITL. 0947120.

3,650,617.—SWITCHING DETECTOR—A. MAR. 21, 1972.

3,650,618.—SWITCHING DETECTOR—B. MAR. 21, 1972.

3,650,619.—SWITCHING DETECTOR—C. MAR. 21, 1972.

3,684,890.—PHOTOSENSITIVE MISFEED DETECTOR. AUG. 15, 1972. CAN. 0929631, GRB. 1335444.

3,778,051.—SUPERPOSED SHEET DETECTOR. DEC. 11, 1973. CAN. 0975067.

3,791,729.—APPARATUS FOR MONITORING A SHEET TRANSPORT MECHANISM. FEB. 12, 1974. CAN. 0991244, GRB. 1413069.

3,882,308.—DETECTION SYSTEM FOR SUPERPOSED SHEETS. MAY 6, 1975. CAN. 0929632, GRB. 1342838.

3,932,755.—DEVICE FOR DETECTING DOUBLE SHEET FEEDING. JAN. 13, 1976.

3,948,508.—SHEET DETECTING APPARATUS. APR. 6, 1976.

4,025,187.—BUCKLE CONTROL SYSTEM. MAY 24, 1977.

4,077,519.—CURL DETECTOR AND SEPARATOR. MAR. 7, 1978.

4,203,586.—MULTIFEED DETECTOR. MAY 20, 1980.

Class 6G

3,152,757.—XEROGRAPHIC CONTROL APPARATUS. OCT. 13, 1964. JAP. 0494168.

3,260,455.—STEPPED COUNTING APPARATUS. JULY 12, 1966. ARG. 0157223, BRA. 0083779, CAN. 0760825, FRA. 1459930, GER. 1513422, GRB. 1113420, ITL. 0729650, MEX. 0094217.

3,301,126.—REPRODUCING APPARATUS. JAN. 31, 1967. CAN. 0777413, EIR. 0029760, GRB. 1122626, ISR. 0034136, JAP. 0669365, NOR. 0128732.

3,358,570.—COPY COUNTING SYSTEM. DEC. 19, 1967. CAN. 0842444, FRA. 1508192, GER. 1283855, GRB. 1165943, ITL. 0787991, JAP. 0572187.

3,375,780.—SHEET COUNTING MECHANISM FOR REPRODUCTION MACHINES. APR. 2, 1968.

3,375,783.—COPY INDICATING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.

3,588,472.—LOGIC CONTROL APPARATUS. JUNE 28, 1971. ARG. 0181590, ATR. 0279353, BEL. 0706629, BRA. 6793350, CAN. 0834957, FRA. 1567082, GRB. 1204719, ITL. 0815466, JAP. 0645591, LXB. 0054882, MEX. 0101675, VZL. 0023684.

3,655,281.—BILLING APPARATUS. APR. 11, 1972. BEL. 0760911, CAN. 0929013, FRA. 7047633, GRB. 1329579, ITL. 0913956, JAP. 0766713.

3,813,157.—CONTROL LOGIC FOR TROUBLE DETECTION AND RECOVERY. MAY 28, 1974. GRB. 1457781, ITL. 1009725, SPN. 0425049.

3,831,933.—TAMPER DETECTION AND RECOVERY. AUG. 27, 1974. GRB. 1457781, ITL. 1009725, SPN. 0425049.

3,909,128.—CONTROL LOGIC FOR CHARGING A MULTI-MODE COPIER DUPLICATOR FROM ONE MODE TO ANOTHER. SEPT. 30, 1975. BEL. 0819383.

3,916,171.—COUNTING CIRCUIT. OCT. 28, 1975.

3,989,368.—DUAL MODE CONTROL LOGIC FOR A MULTI-MODE COPIER DUPLICATOR. NOV. 2, 1976. BEL. 0819384.

4,019,028.—PRINTING MACHINE WITH VARIABLE COUNTER CONTROL SYSTEM. APR. 19, 1977. BEL. 0812560, GRB. 1451992, ITL. 1010688, SPN. 0424462.

4,057,341.—DUAL MODE CONTROL LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. NOV. 8, 1977. AUS. 489874, BEL. 819384, CAN. 1029431, GRB. 1470598, MEX. 137406.

4,058,815.—METERING SYSTEM FOR A COPIER/DUPLICATOR MACHINE. NOV. 15, 1977. BEL. 824682, FRA. 7501637, GRB. 1451991.

4,173,408.—DEMAND PUBLISHING ROYALTY ACCOUNTING SYSTEM FOR AN ELECTROSTATIC COPIER. NOV. 6, 1979.

4,179,212.—DEMAND PUBLISHING ROYALTY ACCOUNTING SYSTEM. DEC. 18, 1979.

4,210,319.—COPY SET COUNTER DUPLEX TRAY. JULY 1, 1980.

Class 6H

3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.

3,357,400.—ELECTROSTATIC APPARATUS FOR PAPER DETACKING. DEC. 12, 1967. CAN. 0841229, MEX. 0100315.

3,450,402.—SHEET STRIPPER APPARATUS. JUNE 17, 1969.

3,506,259.—ELECTROSTATIC SHEET DETACKING APPARATUS. APR. 14, 1970. ARG. 0177881, AUS. 0418161, BEL. 0721966, CAN. 0848612, FRA. 1585343, GRB. 1230113, ITL. 0895052, MEX. 0104231.

3,578,859.—MECHANICAL STRIPPING APPARATUS. MAY 18, 1971. ARG. 0185526, AUS. 0445289, BEL. 0752938, CAN. 0922771, CHL. 0025913, EGR. 0085002, FRA. 7024669, GRB. 1296763, GUA. 0002611, ITL. 0900197, MEX. 0117139, PLD. 0081340, PNM. 0002049, SPN. 0381384, STZ. 0523150, SWD. 0366849, TIW. 0007785, USR. 0443525, VZL. 0032781.

3,620,615.—SHEET STRIPPING APPARATUS. NOV. 16, 1971. CAN. 0927472, GRB. 1290518.

3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972.

3,774,907.—VACUUM SHEET STRIPPING APPARATUS. NOV. 27, 1973. CAN. 0966519.

3,804,401.—PNEUMATIC STRIPPING APPARATUS. APR. 16, 1974. CAN. 0998705.

3,811,670.—ELECTROSTATOGRAPHIC APPARATUS WITH AIR BAFFLE. MAY 21, 1974.

3,819,175.—VACUUM STRIPPING ROLL WITH STATIONARY PICKUP SLOTS. JUNE 25, 1974.

3,820,778.—VACUUM STRIPPING ROLL WITH ROTARY PICKUP SLOTS. JUNE 28, 1974. CAN. 1010081, GRB. 1430856.

3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974. CAN. 1001104.

3,837,640.—STRIPPER FINGER WITH AIR CUSHION. SEPT. 24, 1974. CAN. 1002077, FRA. 7338663, GRB. 1427058, ITL. 998964.

3,857,560.—ADHESIVE PAPER PICK-OFF SYSTEM. DEC. 31, 1974.

3,885,785.—VACUUM TRANSPORT. MAY 27, 1975. CAN. 1008892, FRA. 7437717.

3,885,786.—STRIPPER FINGER. MAY 27, 1975. GRB. 1402956.

3,891,206.—SHEET STRIPPING APPARATUS. JUNE 24, 1975. CAN. 1003868, GRB. 1449754.

3,895,793.—VACUUM SHEET STRIPPER. JULY 22, 1975. CAN. 1014179.

3,907,280.—FLEXIBLE SHEET HANDING DEVICE. SEPT. 23, 1975. FRA. 7322885.

3,940,126.—SHEET HANDLING MECHANISM. FEB. 24, 1976. GRB. 1450219.

3,948,507.—COPYING STRIPPER. APR. 6, 1976.

3,970,381.—METHOD AND APPARATUS FOR XEROGRAPHIC REPRODUCTION. JULY 20, 1976. BEL. 0811188, FRA. 7406478, GRB. 1451288, ITL. 1008269, SPN. 0423529, STZ. 3672880.

3,991,999.—REVOLVING STRIPPER FINGER. NOV. 16, 1976.

3,992,000.—SHEET STRIPPER. NOV. 16, 1976.

3,998,536.—METHOD & APPARATUS FOR ELECTROSTATIC PAPER STRIPPING. DEC. 21, 1976.

4,004,802.—SHEET STRIPPING DEVICE. JAN. 25, 1977.

4,017,065.—TRANSFER FUSING SPEED COMPENSATION. APR. 12, 1977.

4,017,067.—TRANSFER-FUSING SPEED COMPENSATION. APR. 12, 1977.

4,026,541.—SHEET STRIPPING DEVICE. MAY 31, 1977.

4,058,306.—DETACK AND STRIPPING SYSTEM. NOV. 15, 1977.

4,060,235.—SELF-LIFTING VACUUM STRIPPER. NOV. 29, 1977.

4,072,307.—CORNER SHEET STRIPPER. FEB. 7, 1978.

4,073,585.—SHEET REMOVING DEVICE FOR USE IN ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 14, 1978.

4,092,021.—UNFUSED IMAGE TRANSPORT. MAY 30, 1978.

4,119,307.—SHEET STRIPPING APPARATUS. OCT. 10, 1978.

4,119,308.—SHEET STRIPPING APPARATUS. OCT. 10, 1978.

Class 6I

RE.27,720.—SIGNAL STORAGE DEVICE - RE OF 3,416,861-D1593. AUG. 7, 1973.

3,075,493.—XEROGRAPHIC APPARATUS WITH WEB CUTTING MEANS. JAN. 29, 1963. CAN. 0682231, FRA. 1280975, GER. 1177487, GRB. 0979161, JAP. 0502929.

3,105,425.—WEB MARKING AND CUTTING APPARATUS FOR XEROGRAPHIC REPRODUCING DEVICES. OCT. 1, 1963. CAN. 0701949.

3,135,179.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.

3,135,180.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.
3,244,084.—WEB MARKING DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. APR. 5, 1966.
3,401,613.—WEB CUTTER CONTROL DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. SEPT. 17, 1968. CAN. 0786141, GRB. 1118217, JAP. 0517506.
3,402,628.—CUTTING APPARATUS. SEPT. 24, 1968. CAN. 0847666, GRB. 1137800.
3,416,061.—SIGNAL STORAGE DEVICE—REISSUED D72104—27,720. DEC. 17, 1968. CAN. 0824770, GER. 1524998, GRB. 1184579, JAP. 0571176.
3,418,046.—SIGNAL STORAGE DEVICE. DEC. 24, 1968. CAN. 0852814, GER. 1524999, GRB. 1190084, JAP. 0589515.
3,466,959.—WEB MATERIAL HANDLING APPARATUS. SEPT. 16, 1969.
3,485,622.—PRINTING OF TIMING MARKS IN XEROGRAPHIC PROCESS. DEC. 23, 1969. FRA. 1488142, GER. 1522700, GRB. 1047451, JAP. 0608701.
3,504,586.—ROLL CONVERTER CONTROL. APR. 7, 1970.
3,506,175.—ROLL STOCK CONVERTING APPARATUS. APR. 14, 1970.
3,585,289.—FACSIMILE RECORDING APPARATUS WITH CAM OPERATED PAPER CUTTER. JUNE 15, 1971.
3,591,279.—CUT AND DEFLECT WEB DRIVE APPARATUS. JULY 6, 1971. CAN. 0924635, FRA. 7019910, GRB. 1307549, ITL. 0893691.
3,639,053.—WEB CUTTING AND FEEDING APPARATUS. FEB. 1, 1972. ARG. 0192554, AUS. 0461657, BEL. 0749786, CAN. 0917974, FRA. 7015812, GRB. 1314727, ITL. 0900026, MEX. 0116866, SAF. 0703019, SPN. 0379248, STZ. 0516181, SWD. 7006081.
3,728,920.—CUT AND DEFLECT WEB DRIVE APPARATUS. APR. 24, 1973.
3,743,409.—CUTTER ASSEMBLY. JULY 3, 1973. BEL. 0784635, CAN. 0974447, FRA. 7220418, GRB. 1400465, ITL. 0956414.
3,855,890.—SLITTER/PERFORATOR APPARATUS. DEC. 24, 1974. BEL. 808873, CAN. 0996462, FRA. 7345296, GRB. 1423770, ITL. 1001152, USR. 0546267.
3,882,744.—ELECTROSTATOGRAPHIC WEB FEEDING APPARATUS. MAY 13, 1975. FRA. 7417339.
3,931,090.—RUBBER COMPOSITIONS FOR FLEXIBLE BELTS. JAN. 6, 1976.
4,043,233.—METHOD OF PREVENTING MULTI-SHEET FEEDING. AUG. 23, 1977.

Class 6J

3,380,733.—SHEET STRIPPING APPARATUS. APR. 30, 1968. ATR. 0268045, AUS. 0413138, BEL. 0689067, CAN. 0819593, DNK. 0112289, FRA. 1499560, GER. 1522704, GRB. 1157342, HOL. 0151191, ITL. 0788572, JAP. 0560087, LXB. 0052213, MEX. 0101989, NOR. 0122220, NZL. 0146848, PTG. 0046633, SAF. 0666572, SPN. 0332819, STZ. 0468661, SWD. 0326103, USR. 0261292.
3,416,791.—DOCUMENT INVERTING APPARATUS. DEC. 17, 1968. CAN. 0853562, GRB. 1210564, JAP. 0648074.
3,548,783.—PAPER TRANSPORT - SHEET TURNER - PAPER TRANSPORT-90 DEG TURN. DEC. 22, 1970.
3,627,312.—RESTACKING APPARATUS. DEC. 14, 1971. AUS. 0447183, BEL. 0752942, CAN. 0922747, CHL. 0025830, EGR. 0084128, FRA. 7024663, GRB. 1312303, GUA. 0002616, ITL. 0900193, JAP. 791920, MEX. 0114980, PLD. 0081346, PNM. 0001953, SPN. 0381379, STZ. 0525779, SWD. 0359381, TIW. 0022313, VZL. 0032782.
3,856,295.—INVERTER-REVERSER FOR A REPRODUCTION MACHINE. DEC. 24, 1974.
3,862,802.—SHEET REVERSING APPARATUS AND A DUPLEX REPRODUCING APPARATUS EMPLOYING SAME. JAN. 28, 1975. BEL. 0818894.
3,942,785.—SELF-ACTUATING SHEET INVERTER-REVERSER. MAR. 9, 1976.
3,944,212.—SHEET REVERSING MECHANISM. MAR. 16, 1976.
3,947,270.—REPRODUCING APPARATUS AND PROCESS FOR DUPLEX IMAGING IN A SINGLE PASS. MAR. 30, 1976.
4,040,616.—SHEET TURN AROUND INVERTER. AUG. 9, 1977. FRA. 7701111.
7,214,740.—SHEET REVERSING MECHANISM. JULY 29, 1980.

Class 6K

D.227,933.—SORTER. JULY 24, 1973.
D.230,515.—DOCUMENT REPRODUCING AND SORTING MACHINE. FEB. 26, 1974.
D.233,937.—SORTER. DEC. 17, 1974.
D.236,030.—PAPER TRAY. JULY 22, 1975.
3,395,913.—SHEET MATERIAL DISTRIBUTION SYSTEM. AUG. 6, 1968. AUS. 0409539, BEL. 0704922, CAN. 0832159, FRA. 1543565, GRB. 1193517, ITL. 0823413, JAP. 0645590, MEX. 0101165, USR. 0343419.
3,460,824.—MODULAR SHEET DISTRIBUTOR. AUG. 12, 1969. ARG. 0175858, ATR. 0304588, AUS. 0443802, CAN. 0871013, CHL. 0023362, CLB. 0016672, EIR. 0031307, FIN. 0047868, GRB. 1193514, IND. 0112001, ISR. 0028521, JAP. 0645589, MEX. 0099178, NOR. 0125174, NZL. 0149789, PAK. 0119258, PLP. 0006159, PRU. 0009362, SAF. 0674987, SPN. 0344350, STZ. 0478049, SWD. 0342203, TRK. 0014721, URG. 0008514, VZL. 0016672.
3,484,101.—SORTING APPARATUS FOR DOCUMENTS. DEC. 16, 1969. CAN. 0889441, GRB. 1246033.
3,552,739.—SHEET HANDLING APPARATUS. JAN. 5, 1971. BEL. 0738575, CAN. 0921945, FRA. 6930567, GRB. 1274277, ITL. 0871023.
3,565,420.—DOCUMENT FEEDING APPARATUS. FEB. 23, 1971. ARG. 0184075, AUS. 0453309, BEL. 0750391, CAN. 0922328, EGR. 0082941, FRA. 7017112, GRB. 1305825, ITL. 0893198, MEX. 0117914, PLD. 0082841, SPN. 0379694, STZ. 0513435, SWD. 0368797, USR. 0476767.
3,589,808.—REPRODUCING APPARATUS. JUNE 29, 1971. CAN. 0917482.
3,618,936.—JAM DETECTION SYSTEM FOR SORTING APPARATUS. NOV. 9, 1971. AUS. 0445492, BEL. 0758059, CAN. 0949671, EGR. 0088009, FRA. 7041622, GRB. 1324119, ITL. 0909902, PLD. 0081147, SPN. 0385034, STZ. 0525723, TIW. 0007648.
3,622,061.—STAPLE FEED AND FASTENING APPARATUS. NOV. 23, 1971.
3,630,607.—SET SEPARATION COPIER SYSTEM. DEC. 28, 1971.
3,649,006.—SHEET HANDLING APPARATUS. MAR. 14, 1972. BEL. 0762643, CAN. 0944310, FRA. 7104922, GRB. 1341286, ITL. 0918344, JAP. 0795150.
3,652,875.—CONTROL CIRCUIT FOR DRIVING STAPLING MECHANISM. MAR. 28, 1972.
3,669,447.—SHEET PROPELLING APPARATUS. JUNE 13, 1972. CAN. 0938624.
3,671,094.—COVER APPARATUS. JUNE 20, 1972.
3,682,328.—TRAY APPARATUS. AUG. 8, 1972.
3,685,712.—STAPLING APPARATUS. AUG. 22, 1972. CAN. 0953851.
3,690,537.—STAPLE FORMING AND FASTENING APPARATUS. SEPT. 12, 1972.
3,695,756.—SHEET STRIPPING APPARATUS. OCT. 3, 1972. BEL. 0774563, CAN. 0950931, FRA. 7139637, GRB. 1366909, ITL. 0937673.
3,707,418.—METHOD OF BINDING. DEC. 26, 1972. CAN. 0974723, EGR. 0094346, GRB. 1359338.
3,709,485.—CONTROL CIRCUIT FOR SORTING SYSTEM. JAN. 9, 1973.
3,709,492.—SORTING APPARATUS. JAN. 9, 1973. ARG. 0194366, AUS. 0457968, BEL. 0783854, CAN. 0968300, FRA. 7218317, GRB. 1365399, ITL. 0955692, MEX. 0127721, SPN. 0403108, STZ. 0555198.
3,719,266.—SHEET STACKING APPARATUS. MAR. 6, 1973.
3,735,978.—METHOD AND APPARATUS FOR STACKING COPY SHEETS. MAY 29, 1973. ARG. 0190825, BEL. 0772406, CAN. 0951340, FRA. 7133309, GRB. 1358420, ITL. 0936377, MEX. 0125745.
3,788,640.—MOVING BIN SORTING APPARATUS. JAN. 29, 1974. CAN. 0996495, FRA. 7346312, GRB. 1429726.
3,793,016.—ELECTROPHOTOGRAPHIC SHEET BINDING PROCESS. FEB. 19, 1974.
3,794,550.—SHEET BINDING. FEB. 26, 1974. CAN. 1012583, GRB. 1431286.
3,833,911.—REPRODUCTION SYSTEM AND METHOD WITH SIMPLEX AND DUPLEX MODES OF OPERATION. SEPT. 3, 1974.
3,841,754.—DUPLEX REPRODUCTION SYSTEM. OCT. 15, 1974.
3,841,827.—DUPLEX REPRODUCTION SYSTEM. OCT. 15, 1974. BEL. 0816155, FRA. 7419739, GER. 7409422, GRB. 1441370.
3,845,949.—SORTER CONTROL TO PREVENT OVERSTACKING IN THE SORTER TRAYS. NOV. 5, 1974. BEL. 808173, CAN. 1005511, FRA. 7342816, GRB. 1436599, ITL. 1002130, SPN. 0421148.
3,848,995.—COPIER/DUPLICATOR SYSTEM. NOV. 19, 1974. BEL. 0815548, GRB. 1450847, ITL. 1012907, SPN. 0426782.
3,861,219.—METHOD FOR MEASURING HEAT AND PRESSURE CHARACTERISTICS OF FUSING APP. JAN. 21, 1975. CAN. 1013807.
3,861,861.—FUSER ROLL CLEANING APPARATUS. JAN. 21, 1975.
3,866,904.—MULTIPLE FEED SORTING APPARATUS. FEB. 18, 1975. CAN. 1001109, GRB. 1432790.
3,868,019.—TRAY APPARATUS. FEB. 25, 1975. FRA. 7346312, CAN. 0996495, FRA. 7346912, GRB. 1429726.

3,870,295.—SORTER SUPPLEMENT CONTROL. MAR. 11, 1975. CAN. 1007283.
3,871,643.—SORTER CONTROL. MAR. 18, 1975. BEL. 808172, CAN. 1000647, GRB. 1422029, ITL. 1002129, SPN. 0421116.
3,878,818.—CLEANING APPARATUS FOR DRY FUSER ROLLS. APR. 22, 1975. FRA. 7427783, GRB. 1464759.
3,880,119.—DEVELOPMENT APPARATUS. APR. 29, 1975.
3,902,709.—BINLESS SORTER. SEPT. 2, 1975. FRA. 7436985.
3,907,276.—WOBBLE JOGGER. SEPT. 23, 1975.
3,908,978.—BINLESS SORTING APPARATUS. SEPT. 30, 1975. CAN. 0996586, GRB. 1426020.
3,917,256.—DUAL PURPOSE SHEET HANDLING APPARATUS. NOV. 4, 1975. CAN. 1014098.
3,917,257.—SHEET INVERTER APPARATUS. NOV. 4, 1975. CAN. 1005009, FRA. 7346309, GRB. 1430620.
3,938,802.—SHEET STACKING APPARATUS. FEB. 17, 1976. CAN. 1010462, GRB. 1431605.
3,941,369.—SHEET DISTRIBUTING APPARATUS. MAR. 2, 1976.
3,947,018.—UNIVERSAL FEEDER-STACKER. MAR. 30, 1976. BEL. 0836262.
3,953,023.—BIN INDICATOR DEVICE. APR. 27, 1976.
3,971,554.—SHEET STACKER. JULY 27, 1976.
3,973,769.—COMPACT SORTING APPARATUS. AUG. 10, 1976. BEL. 0836261.
3,977,667.—SORTING APPARATUS. AUG. 31, 1976.
3,988,817.—PRESSURE ROLL FOR FUSER APPARATUS. NOV. 2, 1976.
3,990,695.—SORTING APPARATUS. NOV. 9, 1976.
3,995,748.—SORTER APPARATUS. DEC. 7, 1976. BEL. 0844420.
4,011,952.—MANUAL SORTER. MAR. 15, 1977.
4,012,034.—MULTIPLE MODULAR SORTER ASSEMBLY. MAR. 15, 1977.
4,012,035.—SORTER CONTROL SYSTEM. MAR. 15, 1977.
4,015,841.—SORTER. APR. 5, 1977.
4,022,458.—SHEET DISTRIBUTION APPARATUS. MAY 10, 1977.
4,029,309.—SET TRANSPORT AND STACKER. JUNE 14, 1977. BEL. 0847844.
4,033,579.—AN OFFSET STACKER. JULY 5, 1977.
4,037,832.—IMPROVED SORTER APPARATUS. JULY 26, 1977.
4,038,594.—DISTORTIONLESS LINE WAVE AMPLIFICATION. JULY 26, 1977.
4,049,180.—STITCHING HEAD BYPASS APPARATUS. SEPT. 20, 1977.
4,055,339.—SORTER APPARATUS. OCT. 25, 1977.
4,069,728.—SHEET SLITTING APPARATUS. JAN. 24, 1978.
4,084,809.—SHEET STACKING APPARATUS. APR. 18, 1978.
4,087,087.—SHEET STACKING APPARATUS FOR SORTER. MAY 2, 1978.
4,111,410.—SORTING APPARATUS AND REPRODUCING MACHINE. SEPT. 5, 1978.
4,138,076.—STAPLE CASSETTE. FEB. 6, 1979.
4,151,944.—STAPLERS. MAY 1, 1979.
4,175,314.—PNEUMATICALLY CONTROLLED STAPLING SYSTEM. NOV. 27, 1979.
4,181,248.—FIXED STAPLER HEAD. JAN. 1, 1980.
4,184,622.—AN IMPROVED STAPLER HEAD. JAN. 22, 1980.
4,187,969.—FIXED STAPLER HEAD. FEB. 12, 1980.
4,190,247.—SHEET RECEIVING APPARATUS. FEB. 26, 1980. FRA. 7506684, GER. 2506736, GRB. 1494785.
4,194,666.—STAPLE CLINCHING MECHANISM. MAR. 25, 1980.
4,204,727.—MULTIMODE REPRODUCING APPARATUS. MAY 27, 1980.
4,214,746.—A SORTING APPARATUS. JULY 29, 1980.

Class 7

3,784,300.—PRE-TRANSFER STATION. JAN. 8, 1974. AUS. 0465154, BEL. 0789340, CAN. 1000782, EGR. 0106095, FRA. 7234200, GRB. 1379826, ITL. 0972691, MEX. 0128584, SPN. 0409975, STZ. 0557051, SWD. 7215168.
3,809,471.—PHOTOELECTROPHORETIC IMAGING APPARATUS WITH CORRECTION FOR PARALLAX. MAY 7, 1974.
3,819,263.—CLEANING APPARATUS. JUNE 25, 1974. ARG. 0200252, AUS. 0469469, BEL. 0796984, EGR. 0104374, FRA. 2177733, GRB. 1421929, ISR. 0041829, ITL. 0983618, MEX. 131438, SAF. 0732067, SPN. 0439774, STZ. 0556047, SWD. 7304022.

Class 7A

3,850,517.—HIGH SPEED PRINTOUT SYSTEM. NOV. 26, 1974.

Class 7A 1

3,148,581.—CYLINDRICAL SURFACE PROJECTION APPARATUS. SEPT. 15, 1964.
3,273,999.—IMAGE DEFORMATION UTILIZING A PRISM. SEPT. 20, 1966. AUS. 0274351, CAN. 0840628, FRA. 1367772, GRB. 1034097, ITL. 0699466, SAF. 0002971, SWD. 0306232.
3,320,061.—MASKING BY TOTAL INTERNAL REFLECTION FOR IMAGE REPRODUCTION AND DISPLAY. MAY 16, 1967. CAN. 0847533, FRA. 1401615, GER. 1497081, GRB. 1065986, ITL. 0729029, JAP. 0471308.
3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.
3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.
3,519,344.—IMAGE PROJECTION. JULY 7, 1970.
3,622,217.—LIGHT PRODUCING SYSTEM. NOV. 23, 1971.

Class 7A 2

3,196,765.—IMAGE DEVELOPMENT AND PROJECTION. JULY 27, 1965.
3,355,308.—PROJECTION TRANSPARENCY HAVING A TRANSPARENT POWDER IMGE. NOV. 28, 1967.
3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.

Class 7A 2A

3,999,038.—FLARED FUSER ROLLL. DEC. 21, 1976.

Class 7B

3,501,294.—METH OF TREATNG SURFACE OF XIC PLATE W/METAL SALT OF A FATTY ACID TO IMPROVE IMAGE TRANSFER. MAR. 17, 1970. ARG. 0168294, AUS. 0419434, BEL. 0706369, CAN. 0880230, CHL. 0027764, FRA. 1544449, GRB. 1209644, ITL. 0822799, MEX. 0102265, PNM. 0002797, SWD. 0340047, VZL. 0023670.
3,690,754.—CONTROL SYSTEM FOR AN OPTICAL IMAGING SYSTEM. SEPT. 12, 1972. CAN. 0949797, GRB. 1337420.
3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.
3,973,843.—ELECTROSTATOGRAPHIC IMAGING APPARATUS. AUG. 10, 1976. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.
4,064,285.—ELECTROPHOTOGRAPHIC DECALCOMANIAS. DEC. 20, 1977.
4,066,802.—COLORED XEROGRAPHIC IMAGE TRANSFER PROCESS. JAN. 3, 1978.
4,126,455.—ELECTROSTATOGRAPHIC IMAGING PROCESS AND RELATED APPARATUS. NOV. 21, 1978. AUS. 467835. BEL. 802879. CAN. 995963. FRA. 7328588. GRB. 1437041. ITL. 991465. SPN. 417382. USR. 637099.

Class 7C

3,620,616.—TRANSFER DRUM WITHDRAWAL APPARATUS. NOV. 16, 1971. BEL. 0751487, CAN. 0923543, FRA. 7020458, GRB. 1300267, ITL. 0893835.
3,633,543.—BIASED ELECTRODE TRANSFER APPARATUS. JAN. 11, 1972. CAN. 0914398, GRB. 1337123, JAP. 783769.
3,781,105.—CONSTANT CURRENT BIASING TRANSFER SYSTEM. DEC. 25, 1973. FRA. 7341869, GRB. 1448385.
3,795,441.—TRANSFER ROLLER. MAR. 5, 1974.
3,822,093.—TRANSFER REGULATING APPARATUS. JULY 2, 1974. FRA. 7428422.
3,830,589.—CONDUCTIVE BLOCK TRANSFER SYSTEM. AUG. 20, 1974.
3,832,053.—BELT TRANSFER SYSTEM. AUG. 27, 1974.
3,832,055.—FORAMINOUS VACUUM BIAS ROLL TRANSFER SYSTEM. AUG. 27, 1974. CAN. 0999316.
3,837,741.—CONTROL ARRANGEMENT FOR TRANSFER ROLL POWER SUPPLY. SEPT. 24, 1974.
3,837,883.—IMAGE TRANSFER PROCESS. SEPT. 24, 1974. ARG. 0203811, AUS. 0461437, BEL. 0760456, CAN. 0947368, FRA. 7047140, GRB. 1339577, ITL. 0913634, MEX. 0119591, SWD. 7017139.
3,842,800.—TRANSFER ROLLER ASSEMBLY. OCT. 22, 1974. BEL. 0793553, CAN. 9780221, FRA. 7237770, GRB. 1412454, ITL. 0973320, SPN. 0410173, SWD. 7216978.
3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.
3,847,119.—TRANSFER ROLLER ASSEMBLY. NOV. 12, 1974. ARG. 0196224, ATR. 327002, AUS. 0464751, BEL.

0796983, CAN. 0977206, EGR. 0103979, FRA. 7305277, GER. 0103979, GRB. 1413711, ISR. 0041830, ITL. 0983617, MEX. 131018, SAF. 0722068, SPN. 0413018, STZ. 0558033, SWD. 7304021.

3,847,478.—SEGMENTED BIAS ROLL. NOV. 12, 1974.

3,848,204.—PRESSURE ADJUSTABLE ELECTROPHOTOGRAPHIC PRINTING MACHINE TRANSFER APPARATUS. NOV. 12, 1974.

3,860,436.—CONSTANT CURRENT BIASING TRANSFER SYSTEM. JAN. 14, 1975. FRA. 7341869, GRB. 1448385.

3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. FEB. 18, 1975. BEL. 0815546, CAN. 1009503, FRA. 7418641, GRB. 1448386, ITL. 1012842, SPN. 0426760.

3,877,416.—HUMIDITY CORRECTED TRANSFER APPARATUS. APR. 15, 1975. BEL. 0814054, GRB. 1445671, ITL. 1009955, STZ. 0573612.

3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.

3,901,186.—TRANSFER ROLLER ASSEMBLY. AUG. 26, 1975. BEL. 0816848, FRA. 7423024.

3,924,943.—SEGEMENTED BIASED TRANSFER MEMBER. DEC. 9, 1975.

3,936,175.—INTERNALLY SHIELDED TRANSFER ROLLER. FEB. 3, 1976.

3,942,888.—STEPPED TRANSFER ROLLER. MAR. 9, 1976.

3,957,367.—A COLOR ELECTROSTATOGRAPHIC PRINTING MACHINE. MAY 18, 1976.

3,959,574.—BIASABLE MEMBER AND METHOD FOR MAKING. MAY 25, 1976.

3,994,579.—TRANSFER SYSTEM FOR ELECTROPHOTOGRAPHIC PRINTING. NOV. 30, 1976.

4,014,605.—TRANSFER SYSTEM WITH TAILORED ILLUMINATION. MAR. 29, 1977.

4,023,894.—TRANSFER APPARATUS. MAY 17, 1977.

4,025,182.—A TRANSFER APPARATUS FOR A COLOR ELECTROPHOGRAPHIC PRINTING MACHINE. MAY 24, 1977.

4,055,380.—TRANSFER CHARGE MAINTAINING SYSTEM. OCT. 25, 1977.

4,058,879.—COMPOSITIONS AND METHOD FOR ENHANCING ELECTRICAL LIFE OF POLYMERS USED IN XEROGRAPHIC DEVICE. NOV. 22, 1977.

4,062,812.—METHOD FOR EXTENDING THE FUNCTIONAL LIFE OF POLYMERS USED IN XEROGRAPHIC DEVICES. DEC. 13, 1977.

4,087,169.—TRANSFER ROLLER SYSTEM. MAY 2, 1978.

4,098,227.—BIASED FLEXIBLE ELECTRODE TRANSFER. JULY 4, 1978.

4,105,320.—TRANSFER OF CONDUCTIVE PARTICLES. AUG. 8, 1978.

4,110,024.—TRANSFER ASSEMBLY FOR ELECTROSTATIC TRANSFER OF A TONER IMAGE FROM A CURVILINEAR RECORDING. AUG. 29, 1978. BEL. 854404.

4,116,894.—COMPOSITIONS AND METHOD FOR ENHANCING ELECTRICAL LIFE OF COPOLYMERS. SEPT. 26, 1978.

4,134,147.—TRANSFER HUMIDITY CONTROL DEVICE. JAN. 9, 1979.

4,141,728.—TRANSFER OF DRY DEVELOPED ELECTROSTATIC IMAGE USING PLURAL OPPOSITELY CHARGED FIELDS. FEB. 27, 1979.

4,190,348.—LEAD EDGE TRANSFER SWITCHING. FEB. 26, 1980.

4,193,680.—TRANSFER SHEET DRYING DEVICE FOR ELECTROPHOTOGRAPHIC COPYING MACHINE. MAR. 18, 1980.

Class 7C 1

3,150,003.—APPARATUS FOR TRANSFERRING XEROGRAPHIC IMAGES. SEPT. 22, 1964.

3,150,004.—XEROGRAPHIC TRANSFER APPARATUS. SEPT. 22, 1964.

3,244,083.—XEROGRAPHIC DEVICE. APR. 5, 1966. AUS. 0284069, CAN. 0710975, FRA. 1379820, GRB. 1030449, JAP. 0654006.

3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.

3,357,325.—XEROGRAPHIC TRANSFER APPARATUS. DEC. 12, 1967. CAN. 0812525.

3,444,369.—METHOD AND APPARATUS FOR SELECTIVE CORONA TREATMENT OF TONER PARTICLES. MAY 13, 1969. ARG. 0167581, ATR. 0288863, AUS. 0415969, BEL. 0704919, BRA. 6791610, CAN. 0845871, DNK. 0119094, FRA. 1540696, GER. 1597884, GRB. 1203811, HOL. 0152375, ITL. 0853627, JAP. 0587935, MEX. 0099470, SPN. 0345918, STZ. 0487438, SWD. 0337986, VZL. 0023669.

3,765,330.—XEROPRINTING EMPLOYING LETTER PRESS SURFACE COVERED WITH A LAYER OF RESISTIVE MATERIAL. OCT. 16, 1973. CAN. 0949806, GRB. 1374651.

3,850,519.—XEROGRAPHIC IMAGE TRANSFER APPARATUS. NOV. 26, 1974. ARG. 0202116, BEL. 0809579, GRB. 1446252, ITL. 1006786, MEX. 0135278, SPN, 0422230, STZ. 0567748, SWD. 7400197, VZL. 0033340.

3,870,515.—METHOD FOR ELECTROSTATIC PAPER STRIPPING BY NEUTRALIZATION OF TRANSFER CHARGE. MAR. 11, 1975.

3,877,417.—TRANSFER CORONA GENERATING DEVICE WITH SUPPORT BRUSHES. APR. 15, 1975.

3,918,403.—CORONA TRANSFER MECHANISM. NOV. 11, 1975.

3,920,325.—MOISTURE STABLE BIAS TRANSFER ROLL. NOV. 18, 1975.

3,966,199.—BELT TRANSFER LOADING SYSTEM. JUNE 29, 1976.

4,014,606.—REPRODUCTION MACHINE WITH TEXTURED TRANSFER ROLLER. MAR. 29, 1977.

4,017,065.—TRANSFER FUSING SPEED COMPENSATION. APR. 12, 1977.

4,017,067.—TRANSFER-FUSING SPEED COMPENSATION. APR. 12, 1977.

4,058,306.—DETACK AND STRIPPING SYSTEM. NOV. 15, 1977.

4,076,407.—DUPLEX COPYING TRANSFER SYSTEM. FEB. 28, 1978.

4,077,709.—TRANSFER CHARGE CONTROL SYSTEM. MAR. 7, 1978.

4,080,053.—TRANSFER APPARATUS AND METHOD. MAR. 21, 1978.

Class 7C 1A

3,319,604.—XEROGRAPHIC TRANSFER APPARATUS. MAY 16, 1967.

Class 7C 2

3,132,037.—XEROGRAPHIC TRANSFER METHOD. MAY 5, 1964. CAN. 0727919.

3,132,050.—XEROGRAPHIC TRANSFER APPARATUS. MAY 5, 1964.

3,795,441.—TRANSFER ROLLER. MAR. 5, 1974.

3,817,616.—THERMAL CHAMBER FOR DEVELOPABILITY REGULATING APPARATUS. JUNE 18, 1974. CAN. 0991247, GRB. 1439527.

3,838,918.—TRANSFER APPARATUS. OCT. 1, 1974. BEL. 0811434, GRB. 1445243, ITL. 1008903.

3,892,962.—THERMAL CHAMBER FOR A DEVELOPABILITY REGULATING APPARATUS. JULY 1, 1975. CAN. 0991247, GRB. 1439527.

Class 7C 3

3,244,083.—XEROGRAPHIC DEVICE. APR. 5, 1966. AUS. 0284069, CAN. 0710975, FRA. 1379820, GRB. 1030449, JAP. 0654006.

3,612,677.—ELECTROSTATIC TRANSFER APPARATUS. OCT. 12, 1971. CAN. 0941220, GRB. 1296742.

3,697,170.—AUTOMATIC DUPLEXING APPARATUS. OCT. 10, 1972. CAN. 0948269.

3,697,171.—SIMULTANEOUS IMAGE TRANSFER. OCT. 10, 1972. ARG. 0192330, AUS. 0461728, BEL. 0777016, CAN. 0948267, FRA. 7146256, GRB. 1368456, ITL. 0944212, MEX. 0124562, SWD. 0366123, VZL. 32765.

3,702,482.—BIAS ROLL TRANSFER. NOV. 7, 1972. ARG. 0191238, BEL. 0777017, CAN. 0962890, FRA. 7146257, GRB. 1368500, ITL. 0944209, MEX. 0126775.

3,734,015.—SINGLE PASS DUPLEXING BY SEQUENTIAL TRANSFER. MAY 22, 1973. ARG. 0192332, BEL. 7777018, CAN. 0948691, FRA. 7146258, GRB. 1368496, ITL. 0944211, MEX. 0124992.

3,902,801.—COLOR CORRECTED PRINTING SYSTEM. SEPT. 2, 1975. GRB. 1465590.

4,093,457.—METHOD OF TRANSFER.

4,188,213.—COLOR CORRECTED PRINTING SYSTEM. FEB. 12, 1980. CAN. 1037545, GRB. 1465590.

Class 7C 4

3,444,369.—METHOD AND APPARATUS FOR SELECTIVE CORONA TREATMENT OF TONER PARTICLES. MAY 13, 1969. ARG. 0167581, ATR. 0288863, AUS. 0415969, BEL. 0704919, BRA. 6791610, CAN. 0845871, DNK. 0119094, FRA. 1540696, FRA. 1540696, GRB. 1203811, HOL. 0152375, ITL. 0853627, JAP. 0587935, MEX. 0099470, SPN. 0345918, STZ. 0487438, SWD. 0337986, VZL. 0023669.

3,640,249.—TRANSFER APPARATUS. FEB. 8, 1972. BEL. 0758058.

3,647,292.—TRANSFER APPARATUS. MAR. 7, 1972. AUS. 0450919, BEL. 0759452, CAN. 0919004, FGR. 0086978, FRA. 7043065, GRB. 1319148, ITL. 0909441, JAP. 0773213, SPN. 0385845, STZ. 0519187, SWD. 7015876.

3,650,617.—SWITCHING DETECTOR-A. MAR. 21, 1972.
3,650,618.—SWITCHING DETECTOR-B. MAR. 21, 1972.
3,687,545.—SHORT FOCAL LENTH OPTICAL IMAGING SYSTEM. AUG. 29, 1972. BEL. 0747977, CAN. 0913438, FRA. 7011547, GRB. 1300156, ITL. 0898935, JAP. 0731226.
3,729,311.—ELECTROSTATIC TRANSFER METHOD. APR. 24, 1973.
3,854,974.—METHOD FOR TRANSFERRING A TONER IMAGE. DEC. 17, 1974.
3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.
3,932,035.—APPARATUS FOR TRANSFERRING A TONER IMAGE. JAN. 13, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. NOV. 30, 1976. GRB. 1429517.
4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11, 1977. GRB. 1429517.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. MAY 17, 1977. BEL. 0819537, GRB. 1429518.

Class 7E

3,132,050.—XEROGRAPHIC TRANSFER APPARATUS. MAY 5, 1964.
3,375,781.—REGISTRATION MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,375,782.—PROGRAMMING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,422,756.—PAPER SUPPORT AND REGISTRATION MEANS FOR REPRODUCTION MACHINE. JAN. 21, 1969.
3,499,374.—XEROGRAPHIC PRINTER. MAR. 10, 1970. AUS. 0415164, BEL. 0677146, CAN. 0846424, FRA. 1470069, GRB. 1135603, ITL. 0762255, MEX. 0091183, SWD. 0327142.
3,687,541.—XEROGRAPHIC DUPLEX TECHNIQUE. AUG. 29, 1972. CAN. 0948268.
3,847,642.—METHOD FOR TRANSFERRING ELECTROSTATOGRAPHICALLY FORMED IMAGES. NOV. 12, 1974.
3,848,204.—PRESSURE ADJUSTABLE ELECTROPHOTOGRAPHIC PRINTING MACHINE TRANSFER APPARATUS. NOV. 12, 1974.
3,854,974.—METHOD FOR TRANSFERRING A TONER IMAGE. DEC. 17, 1974.
3,867,168.—TRANSPARENCY. FEB. 18, 1975.
3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.
3,932,035.—APPARATUS FOR TRANSFERRING A TONER IMAGE. JAN. 13, 1976.
3,936,174.—TRANSFER ROLLER WITH STATIONARY INTERNAL ELECTRODE. FEB. 3, 1976.
3,954,332.—REPRODUCTION MACHINE WITH IMPROVED TRANSFER ROLL. MAY 4, 1976.
3,954,333.—TRANSFER ROLL HAVING MEANS FOR MONITORING AND CONTROLLING THE RESITIVITY THEREOF. MAY 4, 1976.
3,977,779.—ELECTROSTATOGRAPHIC TRANSFER WITH AIR. AUG. 31, 1976. GRB. 1459450.

Class 7E 1

3,374,769.—TONER FUSING APPARATUS. MAR. 26, 1968. CAN. 0819836, FRA. 1396610, GER. 1522709, GRB. 1152067, JAP. 0534764.
3,685,896.—DUPLICATING METHOD AND APPARATUS. AUG. 22, 1972.
3,845,742.—FUSER ROLL CONSTRUCTION. NOV. 5, 1974. GRB. 1450882.
3,849,062.—REINFORCED FUSER ROLL CONSTRUCTION. NOV. 19, 1974.
4,064,285.—ELECTROPHOTOGRAPHIC DECALCOMANIAS. DEC. 20, 1977.
4,066,802.—COLORED XEROGRAPHIC IMAGE TRANSFER PROCESS. JAN. 3, 1978.

Class 7E 3

3,157,546.—IMAGE TRANSFER. NOV. 17, 1964. ATR. 0225034, BEL. 0602721 FRA. 1287124, GER. 1271547, GRB. 0985176, ITL. 0647042, JAP. 0414127, STZ. 0383417.
3,591,276.—METHOD AND APPARATUS FOR OFFSET XEROGRAPHIC REPRODUCTION. JULY 6, 1971. CAN. 0894931, GER. 1811893, GRB. 1245426, JAP. 0648075.
3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.
3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.
4,064,285.—ELECTROPHOTOGRAPHIC DECALCOMANIAS. DEC. 20, 1977.

Class 8

3,961,236.—CONSTANT POWER REGULATOR FOR XEROGRAPHIC FUSING SYSTEM. JUNE 1, 1976.
4,027,138.—A FUSER RELEASE MATERIAL DISPENSER. MAY 31, 1977.
4,104,692.—DEVICE FOR DETECTING ABNORMAL TEMPERATURE IN FIXER. AUG. 1, 1978.

Class 8A

D.233,414.—TONER BOTTLE OR THE LIKE. OCT. 29, 1974.
3,130,064.—METHOD OF FORMING RESIN PATTERN ON A PAPER RECORD CARD. APR. 21, 1964.
3,778,222.—FIRE PREVENTION APPARATUS. DEC. 11, 1973.
3,830,590.—SORTER APPARATUS OF PRINTER SYSTEM. AUG. 20, 1974. AUS. 0466096, BEL. 0791361, CAN. 0998425, CHL. 0027890, EGR. 0102488, FRA. 7240557, GRB. 1400619, IND. 0137843, ISR. 0040831, ITL. 0970911, MEX. 0128646, NOR. 0135210, NZL. 0168971, PLP. 0008722, PTG. 0058789, SAF. 0728101, SPN. 0408628, STZ. 0560108.
3,834,861.—PRESSURE HEATED FUSER ASSEMBLY. SEPT. 10, 1974. GRB. 1424307.
3,847,391.—STACKING CONTROL APPARATUS. NOV. 12, 1974. ARG. 0194365, AUS. 0454812, BEL. 0783855, CAN. 0969205, FRA. 7218318, GRB. 1365400, ITL. 0955693, MEX. 0128712, SPN. 0403109, STZ. 0557242.
3,848,868.—SHEET SORTING APPARATUS. NOV. 19, 1974. CAN. 1005387, GRB. 1440557.
3,856,461.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974.
3,856,462.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974. BEL. 0821050, FRA. 7435222.
3,868,744.—CLEANING APPARATUS FOR HEATED PRESSURE ROLL FUSER. MAR. 4, 1975. AUS. 0466542, BEL. 0794569, CAN. 1007407, FRA. 7302888, GRB. 1424132, ITL. 0978560, SPN. 0410976, SWD. 7301015.
3,883,921.—CLEANING ROLL APPARATUS HAVING REJUVENATED CLEANING SURFACE. MAY 20, 1975.
3,936,658.—FUSER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. FEB. 3, 1976. BEL. 0844831.
3,998,450.—IMPROVED SORTING APPARATUS. DEC. 21, 1976. GRB. 1433088.
4,004,549.—ROLL FUSER. JAN. 25, 1977.
4,006,985.—XEROGRAPHIC APPARATUS HAVING TIME CONTROLLED FUSING. FEB. 8, 1977.
4,032,746.—CONTROL SYSTEM FOR A FUSING APPARATUS. JUNE 28, 1977.
4,035,140.—FIXING DEVICE IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 12, 1977.
4,045,163.—HEATED FUSER RELEASE AGENT CONTAINER. AUG. 30, 1977.
4,063,530.—IMAGE FIXING. DEC. 20, 1977.
4,065,586.—FIXING METHOD USING POLYARYLSILOXANES AS RELEASE AGENTS. DEC. 27, 1977.
4,078,286.—HEAT FIXING ROLL FOR ELECTROPHOTOGRAPHIC DUPLICATORS. MAR. 14, 1978.
4,078,948.—FIXING METHOD. MAR. 14, 1978.
4,133,522.—PIVOTING TRAY SORTING APPARATUS. JAN. 9, 1979. CAN. 1011681. GRB. 1455159.
4,144,835.—CONTACT HEAT FIXING APPARATUS. MAR. 20, 1979.
4,146,659.—FUSING TONER ON FUSER MEMBERS MADE OF NOBLE METALS AND ALLOYS THEREOF. MAR. 27, 1979.
4,170,957.—FIXING METHOD AND DEVICE USING POLYARYLSILOXANES AS A RELEASE AGENT. OCT. 16, 1979.
4,172,721.—DYE-AMPLIFIED IMAGING PROCESS. OCT. 30, 1979. AUS. 494739, BEL. 822400, CAN. 1033041, FRA. 7438506, GER. 7438730, GRB. 1484706, ITL. 1025877, SPN. 432205, SWD. 74144650.
4,185,140.—POLYMERIC RELEASE AGENTS FOR ELECTROSCOPIC THERMOPLASTIC TONERS. JAN. 22, 1980. BEL. 831662, FRA. 7523193, MEX. 140595.
4,188,423.—SOLVENT EXTRACTED HEAT FUSER MEMBER. FEB. 12, 1980.
4,196,256.—LONG LIFE FUSER ROLL. APR. 1, 1980.

Class 8A 1

RE.28,802.—FUSING APPARATUS. MAY 4, 1976. CAN. 0990779, FRA. 7338110, GRB. 1436563.

3,219,326.—XEROGRAPHIC FUSING APPARATUS. NOV. 23, 1965. CAN. 0716212.

3,374,769.—TONER FUSING APPARATUS. MAR. 26, 1968. CAN. 0819836, FRA. 1396610, GER. 1522709, GRB. 1152067, JAP. 0534764.

3,396,401.—APPARATUS AND METHOD FOR MARKING OF INTELLIGENCE ON A RECORD MEDIUM. AUG. 6, 1968.

3,409,280.—POROUS DRUM FUSER. NOV. 5, 1968.

3,411,932.—QUALITY XEROGRAPHIC REPRODUCTIONS. NOV. 19, 1968. CAN. 0788948, FRA. 1459094, GER. 1497213, GRB. 1112000, ITL. 0725763, MEX. 0078900.

3,498,592.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAR. 3, 1970. ARG. 0180584, AUS. 0432632, BEL. 0733403, CAN. 0878082, CZC. 0164830, FRA. 6917080, GRB. 1269716, ITL. 0864984, MEX. 0111516, PNM. 0001417, SPN. 0367614, STZ. 0506821, SWD. 0345328, TIW. 0006603, USR. 0340215.

3,519,253.—SELECTIVE XEROGRAPHIC FUSER. JULY 7, 1970. ARG. 0168753, ATR. 0293871, AUS. 0416089, BEL. 0704925, CAN. 0843377, CHL. 0023289, CLB. 0017682, DNK. 0123893, FRA. 1540701, GRB. 1193355, GUA. 0002145, HUN. 0157550, ITL. 0830722, JAM. 0001850, MEX. 0107890, PRU. 0009344, SAF. 0676018, SPN. 0345919, STZ. 0470698, SWD. 0322690, TRD. 0000113, URG. 0008846, USR. 0372852, VZL. 0026101.

3,535,492.—FUSING APPARATUS. OCT. 20, 1970. ARG. 0181204, BEL. 0733663, CAN. 0872978, FRA. 6917190, GRB. 1266932, HOL. 149013, ITL. 0865914, MEX. 0110755.

3,623,710.—FIXING ARRANGEMENT. NOV. 30, 1971.

3,648,991.—METHOD AND APPARATUS FOR SELECTIVE FUSING. MAR. 14, 1972.

3,667,742.—FIXING ARRANGEMENT. JUNE 6, 1972. BEL. 0777318, CAN. 0928766, FRA. 7147890, GRB. 1368307, ITL. 0944393.

3,765,828.—FUSING APPARATUS. OCT. 16, 1973. CAN. 0991256, GRB. 1428800.

3,770,346.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING IN AN ELECTROSTATOGRAPHIC MACHINE. NOV. 6, 1973. CAN. 1002582, GRB. 1421863.

3,781,517.—FUSER THERMAL PROTECTOR. DEC. 25, 1973. GRB. 1441702.

3,792,227.—FUSER APPARATUS. FEB. 12, 1974.

3,819,259.—LIGHT ATTENUATOR. JUNE 25, 1974. GRB. 1428799.

3,826,892.—FUSING APPARATUS. JULY 30, 1974. CAN. 0990779, FRA. 7338110, GRB. 1436563.

3,849,905.—FUSING APPARATUS. NOV. 26, 1974.

3,849,907.—FUSING APPARATUS. NOV. 26, 1974.

3,869,696.—FUSER APPARATUS. MAR. 4, 1975.

3,874,892.—ELECTROSTATOGRAPHIC FUSING PROCESS EMPLOYING REPLACEABLE LINER. APR. 1, 1975. CAN. 0980405, GRB. 1374652.

3,898,424.—RADIANT FUSER XEROGRAPHIC REPRODUCING APPARATUS. AUG. 5, 1975.

3,907,492.—FUSING APPARATUS. SEPT. 23, 1975. CAN. 0990779, GRB. 1436563.

3,939,326.—DUAL RIBBON FUSER. FEB. 17, 1976.

3,944,784.—DUAL RIBBON FUSER. MAR. 16, 1976.

3,953,709.—TWO SOURCE RADIANT FUSER FOR XEROGRAPHIC REPRODUCING APPARATUS. APR. 27, 1976.

3,987,757.—PAPER HANDLING IMPROVEMENTS IN RADIANT FUSER VIA CORRUGATION OF PAPER. OCT. 26, 1976.

4,001,622.—DIRECTIONAL SOURCES OF ELECTROMAGNETIC RADIATION. JAN. 4, 1977. GRB. 1443340.

4,015,103.—A FUSER CONVEYOR BELT. MAR. 29, 1977.

4,021,641.—RADIANT FUSER FOR FIXING TONER IMAGES. MAY 3, 1977.

4,056,706.—APPARATUS & METHOD FOR EXTENDING FUSER RELEASE LIFE. NOV. 1, 1977.

4,064,313.—HEAT FIXING MEMBER FOR ELECTROPHOTOGRAPHIC COPIERS. DEC. 20, 1977.

4,078,285.—HARD ALLOY FUSER MEMBERS. MAR. 14, 1978.

4,092,099.—COPIER PAPER DELIVERY MEANS IN A HEAT-FIXING DEVICE OF A COPYING MACHINE. MAY 30, 1978.

4,102,681.—TRANSFER AND FUSING METHOD. JULY 25, 1978. CAN. 990779, FRA. 7338110.

Class 8A 1A

3,445,626.—FUSING APPARATUS WITH FLASH LAMP CIRCUIT. MAY 20, 1969. CAN. 0843525, GRB. 1180604, JAP. 1075585.

3,465,203.—FLASH LAMP FOR ELECTROSCOPIC TONER. SEPT. 2, 1969. CAN. 0843526, GER. 1589315, GRB. 1185687, JAP. 0758339.

3,474,223.—SELECTIVE FLASH FUSING. OCT. 21, 1969. CAN. 0851811, FRA. 1546257, GRB. 1208770, JAP. 0558445.

3,529,129.—REFLECTION TYPE FLASH FUSER. SEPT. 15, 1970. ARG. 0180678, BEL. 0728716, CAN. 0855311, FRA. 6004567, GRB. 1252465, ITL. 0866971, JAP. 0661180, MEX. 0107835.

3,566,076.—TONER FIXING APPARATUS. FEB. 23, 1971. CAN. 0913164, GRB. 1256471.

3,655,280.—XEROGRAPHIC FUSING METHOD AND APPARATUS. APR. 11, 1972.

3,765,828.—FUSING APPARATUS. OCT. 16, 1973. CAN. 0991256, GRB. 1428800.

3,792,227.—FUSER APPARATUS. FEB. 12, 1974.

3,819,259.—LIGHT ATTENUATOR. JUNE 25, 1974. GRB. 1428799.

3,865,081.—MAGNETIC BRUSH DEVELOPING APPARATUS. FEB. 11, 1975.

3,869,696.—FUSER APPARATUS. MAR. 4, 1975.

3,903,394.—READ/WRITE APPARATUS FOR MAGNETIC RECORDERS. SEPT. 2, 1975.

3,920,952.—DUPLEX FUSING APPARATUS AND METHOD. NOV. 18, 1975.

3,935,424.—FLASH FUSING APPARATUS. JAN. 27, 1976.

3,944,783.—HIGH EFFICIENCY NON CAVITY RADIANT METHOD AND APPARATUS. MAR. 16, 1976.

3,980,424.—FUSER CLEANING ROLLER. SEPT. 14, 1976.

4,001,541.—FLASH FUSING SYSTEM WITH ENERGY CONTROL. JAN. 4, 1977.

4,027,199.—FLASH LAMP MODULATOR SYSTEM. MAY 31, 1977.

4,039,770.—INTERFACE SYSTEM TO CONTROL FLASH LAMP. AUG. 2, 1977.

4,050,801.—RELEASE AGENT APPLICATION SYSTEM FOR A HEATED FUSER ROLL. SEPT. 27, 1977.

4,056,803.—QUICK RELEASE MECHANISM FOR A BACKUP ROLL FUSER EMPLOYED IN A COPIER APPARATUS. SEPT. 27, 1977.

4,090,108.—INTERFACE SYSTEM TO CONTROL FLASH LAMP. MAY 16, 1978.

Class 8A 1B

3,357,401.—XEROGRAPHIC FUSER MONITORING APPARATUS. DEC. 12, 1967.

3,432,639.—FUSING APPARATUS. MAR. 11, 1969. CAN. 0851810, GRB. 1194234, JAP. 0608702.

3,437,407.—XEROGRAPHIC FUSING SYSTEM. APR. 8, 1969. CAN. 0842370. JAP. 0758338.

3,445,626.—FUSING APPARATUS WITH FLASH LAMP CIRCUIT. MAY 20, 1969. CAN. 0843525, GRB. 1180604, JAP. 1075585.

3,449,546.—INFRA-RED HEATER. JUNE 10, 1969. ARG. 0170237, ATR. 0303518, AUS. 0402657, BEL. 0700101, BRA. 6788714, CAN. 0852819, CHL. 0023085, DNK. 0118703, FRA. 1527629, GRB. 1187481, ITL. 0805313, MEX. 0101251, NOR. 0123480, PLD. 0068551, PRU. 0009320, SAF. 0673601, SPN. 0341906, STZ. 0499143, SWD. 0332936, URG. 0008615, VZL. 0026103.

3,507,333.—FIRE PREVENTION SYSTEM. APR. 21, 1970. BEL. 0722599, CAN. 0910255, FRA. 1589864, GRB. 1229495, ITL. 0845253, JAP. 0752504.

3,558,853.—FUSER SYSTEM FOR COPYING MACHINE. JAN. 26, 1971. ARG. 0186145, ATR. 0309984, AUS. 0446113, BEL. 0750389, BRA. 7019023, CAN. 0874013, CZC. 0168526, EGR. 0083065, FRA. 7017316, GRB. 1309129, ITL. 0893097, JAP. 0836943, MEX. 0117915, NZL. 0160101, SPN. 0379651, STZ. 0506817, SWD. 0357840, TIW. 0006834, VZL. 0032597.

3,588,445.—FUSER CONTROL CIRCUIT. JUNE 28, 1971.

3,735,092.—FUSER CONTROL CIRCUIT FOR COPYING APPARATUS. MAY 22, 1973. CAN. 0991254, GRB. 1406655.

3,781,516.—FUSER CONTROL SYSTEM. DEC. 25, 1973. MEX. 0135422.

3,790,747.—REGULATOR FOR XEROGRAPHIC FUSING APPARATUS. FEB. 5, 1974. ARG. 0200245, AUS. 0467385, BEL. 0789339, CAN. 0991252, FRA. 7234199, GRB. 1397586, ITL. 0972690, MEX. 0129168, SPN. 0409974, STZ. 0554008, SWD. 7215167, VZL. 0032607.

3,833,794.—FIXING UNIT FOR USE IN A DUPLICATING APPARATUS. SEPT. 3, 1974.

3,851,144.—FEEDBACK FUSER FOR 730S. NOV. 26, 1974.

3,989,370.—ADAPTIVE FUSER CONTROLLER. NOV. 2, 1976.
3,989,926.—DEVICE FOR PREVENTING OVERHEATING OF ELECTROPHOTOGRAPHIC FIXING DEVICE. NOV. 2, 1976.
4,032,746.—CONTROL SYSTEM FOR A FUSING APPARATUS. JUNE 28, 1977.

Class 8A 2

3,349,702.—FUSER HAVING HEATED AND UNHEATED PORTIONS FOR PRINT FIXING PURPOSES. OCT. 31, 1967. CAN. 0833789, MEX. 0096468.
3,356,831.—XEROGRAPHIC FUSING APPARATUS. DEC. 5, 1967. CAN. 0798466, FRA. 1465786, GER. 1497228, GRB. 1117339, ITL. 0749552, JAP. 0512652.
3,584,195.—HEAT FIXING APPARATUS. JUNE 8, 1971. GRB. 1322354.
3,718,390.—MICROFICHE INDEXER. FEB. 27, 1973. ARG. 0190620, BEL. 0768712, CAN. 0946659, GRB. 1350656, ITL. 0927453, MEX. 0121626, SWD. 7107727.
3,788,873.—FIXING METHOD UTILIZING INTERMEDIATE HEAT TRANSFER. JAN. 29, 1974.
3,810,735.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAY 14, 1974.
3,849,628.—NON-CONTACT TEMPERATURE SENSOR FOR ROLL FUSER OF A XEROGRAPHIC REPRODUCTION APPARATUS. NOV. 19, 1974. CAN. 1002583, GRB. 1322612.
3,881,859.—STRIPPER FINGER DESIGN TO PREVENT OIL-ON-THE-COPY. MAY 6, 1975.
3,900,590.—XEROGRAPHIC FUSING APPARATUS. AUG. 19, 1975. CAN. 0992614, GRB. 1192444.
3,904,354.—RESILIENT STRIPPER MEMBERS FORMING A PART OF A FUSER ROLL. SEPT. 9, 1975.
3,937,637.—ROLL CONTACT FUSER. FEB. 10, 1976.
3,940,235.—IMMERSIONS FUSING. FEB. 24, 1976.
3,965,855.—IMMERSION FUSING. JUNE 29, 1976.
3,976,814.—FUSING DEVICE & METHOD. AUG. 24, 1976.
3,997,691.—FUSING SURFACE AND METHOD FOR FIXING TONER. DEC. 14, 1976.
4,000,339.—FUSING SURFACE & METHOD FOR FIXING XEROGRAPHIC TONER. DEC. 28, 1976.
4,015,103.—A FUSER CONVEYOR BELT. MAR. 29, 1977.
4,029,827.—MERCAPTO FUNCTIONAL POLYORGANOSILOKANE RELEASE AGENTS FOR FUSERS IN ELECTROSTATIC COPIERS. JUNE 14, 1977. SPN. 0439743.
4,054,410.—FUSING DEVICE. OCT. 18, 1977.
4,056,706.—APPARATUS & METHOD FOR EXTENDING FUSER RELEASE LIFE. NOV. 1, 1977. FRA 7611767.
4,075,390.—FUSING SURFACE AND METHOD FOR FIXING TONER. FEB. 21, 1978.
4,101,686.—METHOD OF FUSING TONER IMAGES USING FUNCTIONALIZED POLYMERIC RELEASE AGENTS. JULY 18, 1978. BEL. 831662, FRA. 7523193.
4,150,181.—FIXING METHOD USING POLYSILOXANE-FLUOROCARBON BLENDS AS RELEASE AGENTS. APR. 17, 1979.
4,193,680.—TRANSFER SHEET DRYING DEVICE FOR ELECTROPHOTOGRAPHIC COPYING MACHINE. MAR. 18, 1980.

Class 8A 2A

3,256,002.—XEROGRAPHIC FIXING DEVICE. JUNE 14, 1966. ADN. 0000470, AUS. 0295646, BRS. 0033738, BRU. 0000569, CAN. 0796441, FIJ. 0000343, GHA. 0000995, GIB. 1089537, GIE. 0006669, GRB. 1089537, GUR. 1089537, HGK. 0009269, ISR. 0030229, JAP. 0537119, JER. 0000P98, KEN. 0001745, MAU. 1917571, MLS. 0015169, NIG. 0001618, NZL. 0148733, SBH. 0005369, SGP. 0008369, SHL. 0000018, SLN. 3677286, SRK. 0000386, STZ. 0458077, UGD. 0000369.
3,268,351.—XEROGRAPHIC FIXING METHOD AND APPARATUS. AUG. 23, 1966. JAP. 0489660.
3,291,466.—XEROGRAPHIC FIXING DEVICE. DEC. 13, 1966. CAN. 0800935, FRA. 1458647, GRB. 1122628, ITL. 0729649, JAP. 0524526, MEX. 0090836.
3,324,791.—XEROGRAPHIC ROLLER FUSER DRIVE APPARATUS. JUNE 13, 1967. CAN. 0825903, GRB. 1135744, JAP. 0512655, STZ. 0520889.
3,327,096.—TEMPERATURE CONTROL CIRCUIT. JUNE 20, 1967. CAN. 0797970, FRA. 1448641, GRB. 1113451, ITL. 0729649, JAP. 0572184, MEX. 0085994.
3,331,592.—XEROGRAPHIC FUSING APPARATUS. JULY 18, 1967. CAN. 0823589, JAP. 0512657, MEX. 0108575.
3,357,249.—TEMPERATURE SENSOR. DEC. 12, 1967. CAN. 0810332, GER. 1690654, GRB. 1171381.
3,435,500.—PRESSURE ROLL AND METHOD OF MANUFACTURING. APR. 1, 1969. ARG. 0153406, AUS. 0408490, BEL. 0670480, BRA. 0083780, CAN. 0832922, FRA. 1450156, GER. 1546792, GRB. 1124036, ITL. 0730679, JAP. 0669366, MEX. 0107366, VZL. 0024008.
3,437,032.—HEATED FUSER ROLL. APR. 8, 1969. ARG. 0155221, AUS. 0043081, BEL. 0683308, CAN. 0800936, FRA. 1484969, GRB. 1137227, ITL. 0773369, JAP. 1071499, MEX. 0093105, SPN. 0328427, STZ. 0467476, SWD. 0321410, VZL. 0023990.
3,449,548.—FUSING DEVICE. JUNE 10, 1969.
3,498,596.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAR. 3, 1970. ARG. 0181805, AUS. 0428652, BEL. 0733408, BRA. 6909134, CAN. 0860450, CZC. 0150764, FRA. 6917085, GRB. 1258152, ITL. 0865073, MEX. 0111517, PLD. 0079991, PNM. 0002166, SPN. 0367312, STZ. 0505411, SWD. 0345329, TIW. 0006194, USR. 0230669, VZL. 0025073.
3,539,161.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIALS. NOV. 10, 1970. CAN. 0889987.
3,612,820.—HEAT FIXING APPARATUS FOR LENGTHY FUSIBLE MATERIALS. OCT. 12, 1971.
3,649,992.—CLEANING APPARATUS FOR FUSING SYSTEM. MAR. 21, 1972. CAN. 0980517, GRB. 1340684.
3,667,742.—FIXING ARRANGEMENT. JUNE 6, 1972. BEL. 0777318, CAN. 0928766, FRA. 7147890, GRB. 1368307, ITL. 0944393.
3,690,176.—TEMPERATURE SENSING APPARATUS. SEPT. 12, 1972. GRB. 1383087.
3,718,116.—OIL DISPENSING APPARATUS. FEB. 27, 1973. CAN. 0984895.
3,745,972.—WICKING APPARATUS. JULY 17, 1973. CAN. 0991251, GRB. 1397626.
3,751,216.—FUSER ROLL ASSEMBLY. AUG. 7, 1973.
3,754,819.—APPARATUS FOR PLACING ROLLERS IN CONTACT IN A PRESSURE FUSER ASSEMBLY. AUG. 28, 1973.
3,776,760.—METHOD FOR MANUFACTURING A TETRAFLUOPOETHLENE POLYMER-COATED ROLL. DEC. 4, 1973. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.
3,796,183.—FREE FLOATING PRESSURE BIASING APPARATUS FOR CLEANING ROLL FUSER. MAR. 12, 1974.
3,799,401.—SILICONE OIL CAPACITY CONTROL USING POLYURETHANE BELT. MAR. 26, 1974.
3,820,591.—APPARATUS FOR SENSING DIMENSION OF SHEETS OF MATERL TO BE TRNPRTD THROUGH ELCTRSTIC REPRDCTN M. JUNE 28, 1974. CAN. 1004290.
3,831,553.—WICK FOR OIL DISPENSING APPARATUS. AUG. 27, 1974. CAN. 0984895.
3,852,861.—SURFACES WITH FLUOROCARBON PROCESS FOR MULTIPLE COATING RESINS. DEC. 10, 1974. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.
3,861,860.—DRY FUSER ROLL CLEANING APPARATUS. JAN. 21, 1975.
3,881,085.—FUSER CONTROL CIRCUIT FOR COPYING APPARATUS. APR. 29, 1975. BEL. 0808310, GRB. 1447679.
3,883,291.—OIL APPLICATOR FOR REPRODUCTION MACHINE FUSER. MAY 13, 1975. BEL. 0822048, FRA. 7438048, SPN. 0432090.
3,883,292.—SLEEVELESS PRESSURE ROLL CLEANER. MAY 13, 1975.
3,883,293.—PRESSURE ROLL CONSTRUCTION. MAY 13, 1975.
3,902,845.—METAL FOAM UNDER CONFORMABLE SURFACE REPLACEABLE. SEPT. 2, 1975.
3,906,800.—REUSABLE NIP MEASURING DEVICE AND METHOD. SEPT. 23, 1975.
3,907,493.—VISCO-ELASTIC DAMPENER MECHANISM FOR FUSER ASSEMBLY. SEPT. 23, 1975.
3,908,589.—STRUCTURE FOR APPLYING RELEASE AGENT TO A HEATED FUSER ROLL STRUCTURE. SEPT. 30, 1975.
3,912,901.—PFA TEFLON SLEEVED CHOW PRESSURE ROLL. OCT. 14, 1975.
3,913,521.—COMPOSITE DOCTORING BLADE FOR A HEATED FUSER ROLL UTILIZED FOR FIXING TONER. OCT. 21, 1975.
3,918,397.—CONTACT FUSING APP FOR FIXING TONER IMAGES TO A SUPPORT MEMBER. NOV. 11, 1975.
3,918,804.—APP FOR APPLYING RELEASE MATERIAL TO A CONTACT FUSER ROLL MEMBER UTILIZED IN FIXNG TNR IMGS TO. NOV. 11, 1975.
3,921,573.—CLEANING SYSTEM FOR ELECTROSTATIC REPRODUCING APPARATUS. NOV. 25, 1975.
3,924,564.—FUSER APPARATUS HAVING AN ARTICULATED RELEASE MATERIAL DISPENSER. DEC. 9, 1975.

3,926,058.—CONTACT ARC REPLICATION DEVICE. DEC. 16, 1975.
3,929,094.—ROLL FUSER. DEC. 30, 1975.
3,929,095.—ROLL FUSER. DEC. 30, 1975.
3,929,096.—ROLL FUSER. DEC. 30, 1975.
3,934,113.—ROLL FUSER APPARATUS AND MOUNTING ARRANGEMENT THEREFOR. JAN. 20, 1976.
3,934,547.—RENEWABLE CHOW FUSER COATING. JAN. 27, 1976.
3,935,836.—METERING BLADE FOR A FUSER ROLL. FEB. 3, 1976.
3,938,950.—STRIPPING APPARATUS. FEB. 17, 1976.
3,940,238.—CLEANING STRUCTURE FOR AN ELASTOMERIC FUSER MEMBER. FEB. 24, 1976.
3,940,518.—BAKE TECHNIQUE FOR MANUFACTURING TETRAFLUOROETHYLENE COATED ROLLS. FEB. 24, 1976. GRB. 1452718.
3,941,558.—A CONTACT AND HEATING FIXING DEVICE FOR ELECTROPHOTOGRAPHY. MAR. 2, 1976.
3,942,887.—DRIVE MECHANISM FOR A ROLL FUSER EMPLOYED IN A COPIER APPARATUS. MAR. 9, 1976.
3,948,214.—INSTANT START FUSING APPARATUS. APR. 6, 1976.
3,951,538.—A PERMANENTLY NIPPED CONTACT IMAGE FUSER SYSTEM INCORPORATING A ONE-WAY CLUTCH. APR. 20, 1976.
3,955,916.—FUSER ROLL SHEET STRIPPING APPARATUS. MAY 11, 1976.
3,965,331.—DUAL MODE ROLL FUSER. JUNE 22, 1976.
3,965,332.—SELECTIVE FUSING APPARATUS. JUNE 22, 1976.
3,965,853.—CONTACT FUSER ASSEMBLY. JUNE 29, 1976.
3,965,973.—TEMPERATURE SENSING DEVICE. JUNE 29, 1976.
3,966,394.—PLURAL CLEANING ROLLS ASSEMBLY. JUNE 29, 1976.
3,968,343.—FUSER ROLL TEMPERATURE REGULATOR PROBE. JULY 6, 1976.
3,970,038.—ROLL FUSER. JULY 20, 1976.
3,973,844.—LATCHING MECHANISM FOR THE BACK-UP ROLL OF A ROLL FUSER EMPLOYED IN A COPIER APPARATUS. AUG. 10, 1976.
3,976,370.—BELT TRANSFER AND FUSING SYSTEM. AUG. 24, 1976.
3,980,423.—FUSER CLEANING ROLLER ASSEMBLY. SEPT. 14, 1976.
3,981,085.—AIR STRIPPING DEVICE FOR ELASTOMERIC SURFACE. SEPT. 21, 1976.
3,989,005.—IMPROVED OIL METERING BLADE DEVICE. NOV. 2, 1976.
3,993,124.—METH&APPRTS FOR SUSR ASSMBLY CLING IN ELCTROSTATOGRPC MACHNE-GAMMA METH&APPRTS FOR FUSER END CO. NOV. 23, 1976. BEL. 0793560, FRA. 7246728, ITL. 0973322, SWD. 7216976.
3,996,886.—IMPROVED OIL METERING BLADE HOLDER ASSEMBLY. DEC. 14, 1976.
3,996,887.—IMPROVED OIL METERING BLADE HOLDING DEVICE. DEC. 14, 1976.
3,999,510.—HIGH SURFACE ENERGY CLEANING ROLL. DEC. 28, 1976.
4,000,394.—FUSER THERMAL DETECTOR. DEC. 28, 1976.
4,000,957.—CONTACT FUSER AND RELEASE AGENT APPLICATOR THEREFOR. JAN. 4, 1977.
4,000,963.—CLEANING APPARATUS FOR A HEAT & PRESSURE FUSER. JAN. 4, 1977.
4,004,549.—ROLL FUSER. JAN. 25, 1977.
4,008,955.—FUSER ASSEMBLY FOR AN ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 22, 1977.
4,011,831.—IMPROVED OIL METERING BLADE LOADING ASSEMBLY. MAR. 15, 1977.
4,013,400.—CLEANING APPARATUS FOR A HEAT & PRESSURE FUSER. MAR. 22, 1977.
4,018,555.—CLEANING APPARATUS FOR ROLL FUSER. APR. 19, 1977.
4,025,751.—FUSER ROLL SLEEVE. MAY 24, 1977.
4,026,238.—APP FOR APPLYING RELEASE MATERIAL TO A CONTACT FUSER ROLL MEMBER UTILIZED IN FIXING TONER IMAGE. MAY 31, 1977.
4,028,050—STRIPPER FINGER COMBINATION MOUNTING MEANS THEREFOR. JUNE 7, 1977.
4,034,188.—HEAT FIXING DEVICE FOR COPYING MACHINE. JULY 5, 1977.
4,034,706.—DUAL RELEASE AGENT CU-VITON FUSER. JULY 12, 1977.
4,042,804.—ROLL FUSER APPARATUS. AUG. 16, 1977.
4,043,747.—PRESSURE HEAT FIXING DEVICE. AUG. 23, 1977.
4,045,163.—HEATED FUSER RELEASE AGENT CONTAINER. AUG. 30, 1977.
4,045,164.—USE OF SILICONE OIL AS A POLYETHYLENE OXIDATION RETARDANT IN A TONER IMAGE FUSING APPARATUS. AUG. 30, 1977. GRB. 1498469
4,047,885.—ROTATING WICK OIL DISPENSING SYSTEM. SEPT. 13, 1977.
4,050,801.—RELEASE AGENT APPLICATION SYSTEM FOR A HEATED FUSER ROLL. SEPT. 27, 1977.
4,050,803.—QUICK RELEASE MECHANISM FOR A BACKUP ROLL FUSER EMPLOYED IN A COPIER APPARATUS. SEPT. 27, 1977.
4,050,886.—ROLL FUSER. SEPT. 27, 1977. BEL. 858880.
4,052,150.—OIL WETTED FUSER ROLL STRIPPING APPARATUS. OCT. 4, 1977.
4,062,534.—STRIPPER ARRANGEMENT FOR REMOVING VARIOUS SIZED COPY SHEETS FROM FUSER ROLL. DEC. 13, 1977.
4,064,313.—HEAT FIXING MEMBER FOR ELECTROPHOTOGRAPHIC COPIERS. DEC. 20, 1977.
4,071,735.—EXTERNALLY HEATED LOW-POWER ROLL FUSER. JAN. 31, 1978.
4,075,707.—PROGRAMMED DEVICE CONTROLLER. FEB. 21, 1978.
4,079,227.—CONTACT HEAT FIXING APPARATUS FOR ELECTROPHOTOGRAPHIC REPRODUCTION MACHINES. MAR. 14, 1978.
4,079,228.—PRESSURIZED SOLVENT FUSING. MAR. 14, 1978.
4,079,229.—CONTACTING AND FIXING HEATING APPARATUS. MAR. 14, 1978.
4,080,159.—TILTING PAD STRIPPER FINGER. MAR. 21, 1978.
4,081,213.—FUSER DRIVE SYSTEM. MAR. 28, 1978.
4,082,137.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING AN ELECTROSTATOGRAPHIC MACHINE. APR. 4, 1978. BEL. 793560, CAN. 1025515, FRA. 7246728, GRB. 1418306, ITL. 973322, SWD. 7216976.
4,083,092.—SLEEVED ORGANIC RUBBER PRESSSURE ROLLS. APR. 11, 1978.
4,083,322.—FUSER WICK. APR. 11, 1978.
4,085,794.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING IN AN ELECTROSTATOGRAPHIC MACHINE. APR. 25, 1978. BEL. 793560, CAN. 1025515, FRA. 7246728, GRB. 1418306, ITL. 973322, SWD. 7216976.
4,087,676.—FIXING APPARATUS WITH HEAT AND PRESSURE FOR ELECTROPHOTOGRAPHIC COPIERS. MAY 2, 1978.
4,101,267.—ROLL FUSER CLEANING SYSTEM. JULY 18, 1978. BEL. 846861, FRA. 7630971.
4,114,021.—HEAT ROLL FIXING DEVICE FOR ELECTROPHOTOGRAPHIC COPYING MACHINE. SEPT. 12, 1978.
4,119,831.—CONTACT PRESSURE ADJUSTING DEVICE IN HEATING PRESSING FIXING APPARATUS FOR ELECTROPHOTOGRAPHIC. OCT. 10, 1978.
4,149,797.—SLEEVED ORGANIC RUBBER PRESSURE ROLLS. APR. 17, 1979.
4,156,524.—ROLL FUSER STRIPPING MECHANISM. MAY 29, 1979.
4,207,057.—FIXING DEVICE FOR USE IN ELECTROPHOTOGRAPHIC COPYING MACHINE. JUNE 10, 1980.
4,214,549.—ROLL FUSER APPARATUS AND RELEASE AGENT METERING SYSTEM THEREFOR. JULY 29, 1980.

Class 8A 3

3,180,971.—XEROGRAPHIC FUSING APPARATUS. APR. 27, 1965. CAN. 0734734, GRB. 1027904, JAP. 0524355.
3,219,799.—XEROGRAPHIC FUSING APPARATUS. NOV. 23, 1965.
3,604,892.—FUSING APPARATUS. SEPT. 14, 1971.
3,856,460.—DEVELOPING SYSTEM FOR FILM BY ADIABACTIC HEAT FLOW. DEC. 24, 1974.

Class 8A 4

3,093,039.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. JUNE 11, 1963. CAN. 0744873.

Class 8B

3,117,847.—XEROGRAPHIC POWDER IMAGE FIXING APPARATUS. JAN. 14, 1964.
3,132,047.—XEROGRAPHIC FIXING APPARATUS. MAY 5, 1964. AUS. 0266991, CAN. 0713996, FRA. 1332228, GER. 1571130, GRB. 1012444, JAP. 0835352.
3,148,078.—XEROGRAPHIC FUSING METHOD. SEPT. 8, 1964.

3,149,931.—XEROGRAPHIC VAPOR FUSING APPARATUS. SEPT. 22, 1964. CAN. 0758518.
3,158,509.—XEROGRAPHIC FIXING APPARATUS. NOV. 24, 1964. CAN. 0762382, GRB. 1023052, JAP. 0456309.
3,215,116.—VAPOR FUSING APPARATUS. NOV. 2, 1965.
3,704,524.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 5, 1972. ARG. 0188616, BEL. 0779806, CAN. 0950655, FRA. 7208101, GRB. 1385328, MEX. 0126261.
3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.
3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.
3,934,546.—APPARATUS FOR FIXING WITH SOLVENT VAPORS. JAN. 27, 1976.
3,940,518.—BAKE TECHNIQUE FOR MANUFACTURING TETRAFLUOROETHYLENE COATED ROLLS. FEB. 24, 1976. GRB. 1452718.

Class 8B 1

3,140,159.—XEROGRAPHIC FUSING AND DRYING APPARATUS. JULY 7, 1964.
3,140,160.—XEROGRAPHIC FUSING AND DRYING APPARATUS. JULY 7, 1964.
3,199,223.—XEROGRAPHIC FUSING AND DRYING APPARATUS. AUG. 10, 1965.
3,288,624.—VAPOR FUSING METHOD FOR XEROGRAPHIC POWDER IMAGES. NOV. 29, 1966.

Class 8C

3,158,509.—XEROGRAPHIC FIXING APPARATUS. NOV. 24, 1964. CAN. 0762382, GRB. 1023052, JAP. 0456309.
3,386,822.—SOLVENT CAPSULE FIXING OF POWDER IMAGES. JUNE 4, 1968. CAN. 0712993, FRA. 1430471, GER. 1497196, GRB. 1087201, HOL. 0132775, ITL. 0745341, JAP. 0741995.
3,893,760.—TRANSFER APPARATUS. JULY 8, 1975.
3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.
3,940,235.—IMMERSIONS FUSING. FEB. 24, 1976.
3,965,855.—IMMERSION FUSING. JUNE 29, 1976.
4,063,530.—IMAGE FIXING. DEC. 20, 1977.
4,072,521.—AMIDES OF W AND CIS ALKENOIC ACIDS IN IMAGING PROCESS AND ELEMENT. FEB. 7, 1978.
4,073,649.—DI CARBOXYLIC ACID BIS AMIDES AND IMPROVED IMAGING PROCESS. FEB. 14, 1978.
4,076,641.—W- AND CIS ALKENOIC ACID AMIDES IN ELECTROSTATOGRAPHIC DEVELOPERS. FEB. 28, 1978.
4,099,968.—DICARBOXYLIC ACID BIS-AMIDES IN ELECTROSTATIC IMAGING COMPOSITIONS AND PROCESSES. NOV. 11, 1978.

Class 8D

3,493,412.—TRANSFERRING XEROGRAPHIC TONER IMAGES TO A SOLID CRYSTALLINE PLASTICIZER COATED RECEIVING SURFA. FEB. 3, 1970. CAN. 0880837, MEX. 0096609.
3,640,746.—ADHESIVE CONTACT ELECTRIFICATION IMAGING. FEB. 8, 1972.
3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 8E

3,157,546.—IMAGE TRANSFER. NOV. 17, 1964. ATR. 0225034, BEL. 0602721, FRA. 1287124, GER. 1271547, GRB. 0985176, ITL. 0647042, JAP. 0414127, STZ. 0383417.
3,591,276.—METHOD AND APPARATUS FOR OFFSET XEROGRAPHIC REPRODUCTION. JULY 6, 1971. CAN. 0894931, GER. 1811893, GRB. 1245426, JAP. 0648075.
3,799,827.—PROCESS FOR PROTECTING THE SURFACE OF AN IMAGE. MAR. 26, 1974.
3,816,066.—XEROGRAPHIC FIXING DEVICE. JUNE 11, 1974.
3,861,219.—METHOD FOR MEASURING HEAT AND PRESSURE CHARACTERISTICS OF FUSING APP. JAN. 21, 1975. CAN. 1013807.
3,888,622.—TEMPERATURE SENSING DEVICE. JUNE 10, 1975.
3,928,656.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES WITH PRESSURE SENSITIVE TONER. DEC. 23, 1975. ARG. 0196320, AUS. 0464392, BEL. 0793554, CAN. 1011149, FRA. 7246575, GRB. 1417409, ITL. 0973325, SPN. 0410211, STZ. 0028568.
3,934,477.—TEMPERATURE SENSING DEVICE. JAN. 27, 1976.
3,936,658.—FUSER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. FEB. 3, 1976. BEL. 0844831.
4,055,143.—RELEASE MATERIAL APPLICATION SEAL. OCT. 25, 1977.

Class 9

3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.
3,958,878.—ELECTROSTATIC PROCESSOR HOUSING INTERCHANGABLE RESERVOIRS FOR SUPPING AND RECLAIMING TONER. MAY 25, 1976.
3,980,494.—METHOD OF REDUCING FRICTION IN BLADE CLEANING OF IMAGING SURFACES. SEPT. 14, 1976.
3,983,841.—TONER RECLAIM CONVEYOR. OCT. 5, 1976.
4,093,369.—CLEANING SYSTEM. JUNE 6, 1978.

Class 9A

RE29818.—TONER-RECLAIMING SYSTEM-REISSUE OF PATENT 3,641,979 ISSUED FEB. 15, 1972. OCT. 31, 1978. CAN. 913351.
T.940,022.—PRESSURIZED AND FILTERED XEROGRAPHIC SYSTEM. NOV. 4, 1975.
3,552,850.—LUBRICATED BLADE CLEANING OF IMAGING PHOTOCONDUCTIVE MEMBERS. JAN. 5, 1971. ALB. 0003931, ARG. 0172544, ATR. 0300568, AUS. 0438884, BEL. 0727561, BRA. 6898275, BUR. 0000041, CAM. 0000453, CAN. 0869669, CHL. 0024409, CLB. 0017926, COR. 000947A, DNK. 0122738, EGR. 0075946, EIR. 0032784, FRA. 6902175, GNR. 0000043, GRB. 1259513, GRK. 0039239, IND. 0119582, ISR. 0031502, ITL. 0854622, LIB. P272693, LXB. 0057856, MEX. 0106799, MLG. 0003059, MLW. 00MW769, MNC. 8146975, MRC. 0014725, NOR. 0128683, NZL. 0155207, PAK. 0120897, PLD. 0017650, PLP. 0006639, PNM. 0001979, PRU. 0009588, PTG. 0051062, RHD. 5569489, SAF. 6970696, SPN. 0363130, STZ. 0493016, SWD. 0346398, TGR. 0000550, URG. 0009736, USR. 0385466, VTM. 0001840, VZL. 0023692, ZMB. 0176973.
3,635,704.—IMAGING SYSTEM. JAN. 18, 1972. ALB. 0004133, ARG. 0176978, ATR. 0303521, AUS. 0440759, BEL. 0727560, BRA. 0088093, BUR. 0000042, CAM. 0000463, CAN. 0867697, CHL. 0026254, COR. 000949A, DNK. 0131403, EGR. 0078899, EIR. 0032632, FRA. 6902174, GNR. 0000042, GRB. 1259514, GRK. 0039240, IND. 0119583, ISR. 0031503, ITL. 0871510, LAS. 0000199, LIB. 00P7269, LXB. 0057849, MEX. 0106332, MLG. 0003056, MLW. 00MW869, MNC. 8156975, MRC. 0014724, NZL. 0155208, PAK. 0120859, PLP. 0008511, PNM. 0001676, PRU. 0010443, PTG. 0051063, RHD. 4169529, RMN. 0055464, SAF. 0069995, SPN. 0363127, STZ. 0513431, SWD. 0342921, SYA. 0002477, TGR. 0000551, TIW. 0005257, UAR. 0009525, USR. 0396887, VTM. 0001805, VZL. 0023744, ZMB. 0186974.
3,717,409.—CLEANING OF ELECTROSTATOGRAPHIC SURFACES. FEB. 20, 1973.
3,724,019.—WIPER BLADE CLEANING APPARATUS FOR XEROGRAPHIC MACHINES. APR. 3, 1973. CAN. 991248.
3,724,020.—WIPER BLADE CLEANER FOR XEROGRAPHIC MACHINES. APR. 3, 1973. ARG. 0194951, BEL. 0783490, CAN. 0991249, FRA. 7216778, GER. 2220821, GRB. 1399156, ITL. 0955404, MEX. 0127875.
3,838,472.—TONER CLEANING APPARATUS. OCT. 1, 1974. BEL. 0789325, CAN. 0991694, FRA. 7233424, GER. 2239441, GRB. 1403439, ITL. 0967797, SWD. 7212456.
3,847,480.—CONTINOUS BLADE CLEANER. NOV. 12, 1974.
3,848,992.—DEVELOPER BLADE CLEANING. NOV. 19, 1974. FRA. 7415394, GRB. 1443128, ITL. 0010212.
3,848,993.—SUPPORTED DEVELOPER BLADE CLEANING. NOV. 19, 1974.
3,848,994.—LINE CHARGE TONER CLEANING. NOV. 19, 1974.
3,854,814.—TRANSLATING DWELL CLEANING SYSTEM. DEC. 17, 1974.
3,871,762.—BLADE CLEANING SYSTEM. MAR. 18, 1975.
3,918,807.—CLEANING BLADE FOR PHOTOCOPIER. NOV. 11, 1975.
3,918,809.—APPARATUS FOR CLEANING A SURFACE SUPPORT. NOV. 11, 1975.
3,927,937.—CLEANING ASSEMBLY FOR AN ELECTROSTATOGRAPHIC DEVICE. DEC. 23, 1975. SPN. 0420425.
3,940,282.—BLADE CLEANING OF SURFACE WITH REVERSE MOVEMENT. FEB. 24, 1976.
3,947,108.—CLEANING SYSTEM. MAR. 30, 1976.

3,950,092.—CLEANING TRANSPORTING & SORTING APPARATUS & REPRODUCING MACHINE. APR. 13, 1976.
3,957,509.—METHOD AND APPARATUS FOR REMOVING CONTAMINANTS FROM AN ELECTROSTATIC IMAGING SURFACE. MAY 18, 1976.
3,973,845.—METHOD OF REDUCING FRICTION IN BLADE CLEANING OF IMAGING SURFACES. AUG. 10, 1976.
3,977,898.—METHOD FOR CLEANING A SURFACE SUPPORT. AUG. 31, 1976. GRB. 1438660.
3,992,091.—ROUGHENED IMAGING SURFACE FOR CLEANING. NOV. 16, 1976.
4,002,570.—ELECTROPHOTOGRAPHIC DEVELOPER WITH POLYVINYLIDENE FLUORIDE ADDITIVE. JAN. 11, 1977.
4,007,982.—METHOD AND APPARATUS FOR ULTRASONICALLY CLEANING A PHOTOCONDUCTIVE SURFACE. FEB. 15, 1977.
4,030,824.—A REPRODUCING APPARATUS HAVING AN IMPROVED IMAGING SURFACE CLEANING SYSTEM. JUNE 21, 1977.
4,042,415.—METHOD FOR SCRAPING LIQUIDS FROM A MOVING SURFACE. AUG. 16, 1977.
4,043,659.—CLEANING BLADE TONER ARRESTOR. AUG. 23, 1977.
4,051,536.—ELECTRONIC HALFTONE IMAGING SYSTEM. SEPT. 27, 1977.
4,054,381.—TONER FILTER ARRANGEMENT. OCT. 18, 1977.
4,083,633.—BLADE CLEANING HOLDER. APR. 11, 1978.
4,111,545.—VIBRATING BLADE CLEANER. SEPT. 5, 1978.
4,123,154.—COMBINED CORONA GENERATOR AND IMAGING SURFACE CLEANER. OCT. 31, 1978.
4,131,359.—SENSITIVE MEDIUM CLEANER FOR USE IN ELECTROPHOTOGRAPHIC COPYING MACHINE. DEC. 26, 1978.
4,145,137.—ELECTROPHOTOGRAPHIC REPRODUCING MACHINE BLADE CLEANING APPARATUS. MAR. 20, 1979.
4,158,498.—BLADE DEVELOPING SYSTEM FOR A REPRODUCING APPARATUS. JUNE 19, 1979.
4,174,172.—CLEANING METHODS AND APPARATUS FOR A PHOTOCOPYING DEVICE. NOV. 13, 1979. GRB. 1511199.

Class 9A 1

3,099,856.—WEB CLEANER APPARATUS. AUG. 6, 1963. ARG. 0146853. CAN. 0760369, GRB. 1032957, IND. 0096310, JAP. 0481944.
3,149,356.—XEROGRAPHIC PLATE CLEANING APPARATUS. SEPT. 22, 1964.
3,186,838.—XEROGRAPHIC PLATE CLEANING METHOD UTILIZING THE RELATIVE MOVEMENT OF A CLEANING WEB. JUNE 1, 1965. CAN. 0858757, FRA. 1435510, GER. 1497242, GRB. 1094224, ITL. 0761145.
3,190,198.—XEROGRAPHIC CLEANING APPARATUS. JUNE 22, 1965.
3,337,891.—PLATE CLEANING AND TRANSPORTING APPARATUS. AUG. 29, 1967.
3,380,355.—XEROGRAPHIC CLEANING APPARATUS. APR. 30, 1968. CAN. 0819048.
3,405,682.—XEROGRAPHIC DEVELOPMENT APPTS WITH WEB LOADING MEANS TO REMOVE RESIDUAL DEVELOPER. OCT. 15, 1968. GRB. 1102282.
3,492,732.—WEB QUANTITY INDICATOR. FEB. 3, 1970. CAN. 0887178.
3,526,457.—CLEANING APPARATUS FOR ELECTROSTATIC COPYING MACHINES. SEPT. 1, 1970. CAN. 0880402, GRB. 1225287.
3,615,397.—METHOD OF CLEANING ELECTROSTATIC COPYING MACHINES. OCT. 26, 1971.
3,624,858.—CLEANING APPARATUS. DEC. 7, 1971.
3,664,300.—APPARATUS FOR TREATING THE SURFACE OF AN ELECTROSTATOGRAPHIC IMAGING PLATE. MAY 23, 1972.
3,725,059.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC SURFACE. APR. 3, 1973. GRB. 1337282.
3,781,107.—CLEANING APPARATUS. DEC. 25, 1973.
3,867,170.—METHOD FOR CLEANING LIQUID DEVELOPERS. FEB. 18, 1975. CAN. 0906336, GRB. 1339904.
3,879,785.—CLEANING APPARATUS. APR. 29, 1975.
4,007,983.—IMPROVED LIQUID DEVELOPER CLEANING MEANS. FEB. 15, 1977.
4,089,683.—LIQUID DEVELOPER CLEANING MEANS. MAY 16, 1978.
4,110,035.—CLEANING SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. AUG. 29, 1978.

Class 9A 2

3,477,450.—BRUSH RECLAIMING. NOV. 11, 1969. GRB. 1206539.
3,489,463.—BRUSH SIZING APPARATUS. JAN. 13, 1970. GRB. 1243233, JAP. 0810578.
3,493,269.—LOADING HEAD. FEB. 3, 1970. CAN. 0864392.
3,610,693.—METHOD OF MAKING A CYLINDRICAL BRUSH. OCT. 5, 1971. CAN. 0944415, GRB. 1332920, JAP. 0758464.
3,617,123.—XEROGRAPHIC CLEANING APPARATUS. NOV. 2, 1971.
3,634,077.—METHOD AND APPARATUS FOR REMOVING A RESIDUAL IMAGE IN AN ELECTROSTATIC COPYING SYSTEM. JAN. 11, 1972. BEL. 0737956, CAN. 0896611, FRA. 6929217, GRB. 1259960, ITL. 0870232, JAP. 0742513.
3,664,300.—APPARATUS FOR TREATING THE SURFACE OF AN ELECTROSTATOGRAPHIC IMAGING PLATE. MAY 23, 1972.
3,766,593.—CLEANING APPARATUS FOR INSULATING SURFACES. OCT. 23, 1973. ARG. 0194956, AUS. 0460978, BEL. 0784898, CAN. 0990017, FRA. 7219012, GRB. 1399900, ITL. 0960138, MEX. 0127720. SPN. 404266, STZ. 0538310, SWD. 7208414, VZL. 0032065.
3,947,108.—CLEANING SYSTEM. MAR. 30, 1976.
3,957,509.—METHOD AND APPARATUS FOR REMOVING CONTAMINANTS FROM AN ELECTROSTATIC IMAGING SURFACE. MAY 18, 1976.
4,025,188.—PHOTOACTIVE DEVICE FOR XEROGRAPHY. MAY 24, 1977.
4,113,376.—CLEANING APPARATUS FOR REPRODUCING MACHINE. SEPT. 12, 1978.
4,134,673.—DUAL BRUSH CLEANING APPARATUS. JAN. 16, 1979.
4,205,911.—A CLEANING SYSTEM. JUNE 3, 1980.

Class 9A 2A

3,278,972.—XEROGRAPHIC PLATE CLEANING APPARATUS. OCT. 18, 1966. CAN. 0774795, FRA. 1458646, GER. 1497218, GRB. 1122624, ITL. 0729648, JAP. 0512649.
3,534,427.—CLEANING APPARATUS FOR ELECTROSTATIC PRINTING MACHINES. OCT. 20, 1970. AUS. 0425369, BEL. 0729977, CAN. 0873426, CZC. 0157666, FRA. 6907700, GRB. 1238117, HUN. 0158312, ITL. 0876795, JAP. 0645593, SPN. 0364889, SWD. 0345533, USR. 0372853.
3,590,412.—BRUSH CLEANING DEVICE FOR ELECTROSTATIC MACHINES. JULY 6, 1971. CAN. 0930107, GRB. 1248521, JAP. 0832526.
3,660,863.—CLEANING APPARATUS. MAY 9, 1972. ARG. 0188292, ATR. 0324838, AUS. 0445312, BEL. 0752937, CAN. 0925659, CHL. 0027132, DNK. 0129483, EGR. 0084130, FRA. 7024664. GRB. 1259446, GUA. 0002676, IND. 0127312, ITL. 0900201, MEX. 0115163, NOR. 0133164, NZL. 0160666, PLD. 0081341, PLP. 0007492, PNM. 0002014, PTG. 0054074, SAF. 0704533, SPN. 0381388, STZ. 0514165, SWD. 0359942, TIW. 0007784, USR. 0384250, VZL. 0032417.
3,692,402.—MATERIALS FOR FIBROUS DEVELOPMENT AND CLEANING MEMBER. SEPT. 19, 1972.
3,740,789.—XEROGRAPHIC ROLLER OSCILLATING CLEANING BLADE WITH DRIVE MECHANISM THEREFOR. JUNE 26, 1973. BEL. 0789327, CAN. 0991250, FRA. 7233724, GER. 2243491, GRB. 1403440, ITL. 0967796, SWD. 7212455.
3,742,551.—TONER CLEANING AND STORAGE APPARATUS. JULY 3, 1973. BEL. 0789325, CAN. 0991694, FRA. 7233424, GER. 2239441, GRB. 1403439, ITL. 0967797, SWD. 7212456.
3,788,454.—CHAIN BEAD DRIVE APPARATUS. JAN. 29, 1974. GRB. 1430379.
3,795,025.—ELECTROPHOTOGRAPHIC PHOTORECEPTOR CLEANING APPARATUS. MAR. 5, 1974.
3,807,853.—ELECTROPHOTOGRAPHIC CLEANING APPARATUS. APR. 30, 1974. GRB. 1439229.
4,032,228.—FOREIGN OBJECT DETECTOR BRUSH CLEANER. JUNE 28, 1977.

Class 9A 2B

3,404,418.—SHEET TRANSPORT APPARATUS. OCT. 8, 1968. CAN. 0859327.
3,572,923.—CLEANING METHOD AND APPARATUS FOR ELECTROSTATIC COPYING MACHINES. MAR. 30, 1971. ARG. 0172603, AUS. 0429490, BEL. 0737957, CAN. 0884822, FRA. 6929174, GRB. 1259890, ITL. 0870233, JAP. 0819708, MEX. 0113040, SPN. 0370878, SWD. 0348851.
3,655,373.—CLEANING METHOD FOR ELECTROSTATIC COPYING MACHINE. APR. 11, 1972.

3,668,008.—IONIZED AIR CLEANING DEVICE. JUNE 6, 1972. CAN. 0956406, GRB. 1310836.
3,722,018.—CLEANING APPARATUS. MAR. 27, 1973.
3,738,745.—FUR BRUSH ERASER. JUNE 12, 1973. CAN. 0970554, GRB. 1418036.
4,123,154.—COMBINED CORONA GENERATOR AND IMAGING SURFACE CLEANER. OCT. 31, 1978.

Class 9A 2B 1

3,128,683.—XEROGRAPHIC APPARATUS. APR. 14, 1964.

Class 9A 2C

3,252,274.—XEROGRAPHIC POWDER FILTER. MAY 24, 1966. CAN. 0712876, GER. 1278245, GRB. 1031634, JAP. 0502993.
3,410,060.—XEROGRAPHIC FILTER APPARATUS. NOV. 12, 1968. CAN. 0810976, FRA. 1458648, GRB. 1114505, ITL. 0729638, JAP. 0724232.
3,570,224.—FILTER FOR ELECTROSTATOGRAPHIC DEVELOPER. MAR. 16, 1971.
3,641,979.—TONER RECLAIMING SYSTEM. FEB. 15, 1972. CAN. 0913351.
3,793,986.—TONER RECLAIMING SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. FEB. 26, 1974. ARG. 0194370, AUS. 0464194, BEL. 0784636, GER. 0978341, GRB. 1373721, ITL. 0956416, MEX. 0128265, SPN. 403.704, STZ. 0546970, VZL. 0033339.
3,816,157.—TONER RECLAIMING METHOD. JUNE 11, 1974.
4,046,682.—TONER RECLAIMING SYSTEM. SEPT. 6, 1977. CAN. 1030209.

Class 9B

3,332,328.—XEROGRAPHIC DEVELOPER SEAL AND PROCESS. JULY 25, 1967. CAN. 0792684, GRB. 1138394, JAP. 0512658, MEX. 0091318.
3,607,160.—LIGRCIN CONTAINING PUMICING COMPOSITION. SEPT. 21, 1971.
3,610,749.—IMAGING SYSTEM. OCT. 5, 1971. CAN. 0923541, GRB. 1339905, JAP. 0745767.
3,646,910.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGES. MAR. 7, 1972.
3,668,008.—IONIZED AIR CLEANING DEVICE. JUNE 6, 1972. CAN. 0956406, GRB. 1310836.
3,697,263.—METHOD OF CLEANING RESIDUAL LIQUID DEVELOPER FROM ELECTROPHOTOGRAPHIC PLATES. OCT. 10, 1972. ARG. 0181940, AUS. 0455091, BEL. 0758060, CAN. 0906334, EGR. 0087483, FRA. 7041623, GRB. 1328406, ITL. 0916264, JAP. 0749381, MEX. 0116862, SPN. 0385000, STZ. 0519186, SWD. 0365624, TIW. 0006850, USR. 0349206, VZL. 0032211.
3,834,804.—COPYING MACHINE WITH MEANS FOR MOUNTING CARRIER BEAD PICKOFF ROLLER THEREIN. SEPT. 10, 1974.
4,026,701.—GAS IMPINGMENT & SUCTION CLEANING APPARATUS. MAY 31, 1977.
4,111,546.—ULTRASONIC CLEANING APPARATUS FOR AN ELECTROSTATOGRAPHIC REPRODUCING MACHINE. SEPT. 5, 1978.
4,121,947.—METHOD OF CLEANING A PHOTORECEPTOR. OCT. 24, 1978.

Class 9B 1

3,920,329.—BACKGROUND REMOVAL APPARATUS. NOV. 18, 1975.
4,108,546.—CLEANING APPARATUS AND ELECTROSTATORAPHIC REPRODUCING MACHINE. AUG. 22, 1978.
4,116,555.—BACKGROUND REMOVAL APPARATUS. SEPT. 26, 1978.
4,127,327.—APPARATUSES INCORPORATING A COMPOSITE SUPPORT MEMBER. NOV. 28, 1978.

Class 9B 2

RE.28,566.—CLEANING APPARATUS. OCT. 7, 1975. CAN. 0913310, MEX. 0113698.
3,424,615.—METHOD AND APPARATUS FOR CLEANING XEROGRAPHIC PLATES. JAN. 28, 1969. CAN. 0842022, GRB. 1158521, JAP. 0561239.
3,580,673.—CLEANING APPARATUS-REISSUED AS RE28566-D2266R. MAY 25, 1971. CAN. 0913310, MEX. 0113698.
3,615,398.—METHOD FOR ELECTROSTATIC COPYING INCLUDING AN IMPROVED PROCESS OF CLEANING PHOTOCONDUCTV SRFACE. OCT. 26, 1971.
3,625,683.—PROCESS FOR CLEANING A PHOTO-CONDUCTIVE DRUM OF RESIDUAL TONER PARTICLES AND REUSE OF THE SAME. DEC. 7, 1971. CAN. 0937800, GRB. 1329982.
3,628,950.—METHOD OF REMOVING THE RESIDUAL TONER PARTICLES FROM A PHOTOCONDUCTIVE SURFACE. DEC. 21, 1971.
3,640,707.—IMAGING SYSTEM. FEB. 8, 1972.
3,655,375.—INTERMITTENT GRIT REMOVAL PROCESS. APR. 11, 1972. CAN. 0924493, GRB. 1341404, JAP. 0746926.
3,656,948.—SELECTED REMOVAL OF LIQUID DVLPR IN CYCLICAL ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. CAN. 0906335, GRB. 1335054, JAP. 0760503.
3,776,631.—LIQUID DEVELOPER CLEANING SYSTEM. DEC. 4, 1973.

Class 9B 3

3,128,683.—XEROGRAPHIC APPARATUS. APR. 14, 1964.
3,483,034.—PROCESS OF CLEANING XEROGRAPHIC PLATES. DEC. 9, 1969. CAN. 0800825, FRA. 1463257, GER. 1497235, GRB. 1125594, ITL. 0750154.
3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971.
3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 0933997.
3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. ARG. 0181932, MEX. 0116451.
3,671,290.—IMAGING SYSTEM. JUNE 20, 1972.
3,702,303.—CLEANING OF PHOTOCONDUCTIVE INSULATING SURFACES. NOV. 7, 1972. CAN. 0944650, GRB. 1369451.
3,762,950.—CLEANING OF PARTICLES FROM A SURFACE. OCT. 2, 1973. ARG. 0195076, AUS. 0464713, BEL. 7916681, CAN. 0974009, FRA. 7241538, GRB. 1400238, ITL. 0971072, MEX. 0128580, SPN. 0408837, STZ. 0553433, SWD. 7215089, VZL. 0032005.
3,849,171.—METHOD FOR CLEANING BACKGROUND AREAS FROM DEVELOPED RECORDING SURFACES. NOV. 19, 1974. CAN. 0941882.
3,862,801.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC IMAGING SURFACE. JAN. 28, 1975. GRB. 1337282.
3,937,665.—PHOTORECEPTOR SOLVENT CLEANER. FEB. 10, 1976.
3,979,317.—VOLATILE CLEANING SOLUTION FOR PHOTORECEPTOR. SEPT. 7, 1976.
4,054,534.—VOLATILE CLEANING SOLUTION FOR MIRRORS AND LENSES. OCT. 18, 1977.

Class 10

3,945,728.—AN ALARM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 23, 1976.
4,089,515.—DOCUMENT STORAGE AND TRANSPORT APPARATUS. MAY 16, 1978. BEL. 850379.
4,109,903.—FLUIDIC FEEDING OF DOCUMENTS TO AN EXPOSURE STATION. AUG. 29, 1978.

Class 10A

RE29,406.—DOCUMENT ORIGINAL HANDLING SYSTEM. SEPT. 20, 1977. FRA. 7442405.
D.230,085.—COPY PAPER CASSETTE. JAN. 22, 1974.
3,100,112.—DOCUMENT FEED MECHANISM. AUG. 6, 1963. GRB. 1015635, JAP. 0478676.
3,152,528.—DOCUMENT CARRIER. OCT. 13, 1964. CAN. 0707048, FRA. 1414049, GER. 1197744, GRB. 1032954, ITL. 0737307, JAP. 0471310.
3,220,275.—DOCUMENT DRIVE TRANSMISSION. NOV. 30, 1965.
3,239,215.—DOCUMENT FEED MECHANISM. MAR. 8, 1966. CAN. 0741548, GRB. 1052820, JAP. 0497188.
3,239,220.—DOCUMENT CONVEYOR. MAR. 8, 1966. CAN. 0770495, FRA. 1434188, GRB. 1094188, ITL. 0742434.
3,326,548.—CARD CONVEYING APPARATUS HAVING A ROTARY FRONT GAUGE. JUNE 20, 1967. CAN. 0793702, MEX. 0086197.
3,370,844.—CARD HANDLING-SCANNING DEVICE. FEB. 27, 1968.
3,409,356.—CONVEYOR FOR DOCUMENTS. NOV. 5, 1968. FRA. 1500227, GRB. 1162982, ITL. 0776597.
3,409,357.—APPARATUS FOR AN ELECTROSTATIC MACHINE. NOV. 5, 1968. CAN. 0816416, GRB. 1151104, JAP. 0542588.
3,419,264.—DOCUMENT HANDLING SYSTEM. DEC. 31, 1968. ARG. 0168399, CAN. 0831413, CHL. 0024536, JAM. 0002459, MEX. 0101167, PRU. 0009340, URG. 0009205, VZL. 0023735.
3,424,528.—DOCUMENT CONVEYOR UNIT. JAN. 28, 1969. CAN. 0842644, GRB. 1175596.

3,446,554.—XEROGRAPHIC REPRODUCING APPARATUS. MAY 27, 1969. ARG. 0171943, ATR. 0302040, AUS. 0451715, BEL. 0708649, CAN. 0880187, FRA. 1567148, GRB. 1223426, HUN. 0158170, ITL. 0823019, JAP. 0657008, LXB. 0055166, MEX. 0101029, NOR. 0127833, PLD. 0069795, SPN. 0348801, STZ. 0485581, SWD. 0354529, USR. 0259733, VZL. 0023685.

3,504,908.—DOCUMENT FEEDING APPARATUS CONTROL. APR. 7, 1970.

3,520,605.—DOCUMENT SCAN DRIVE AND RETURN APPARATUS. JULY 14, 1970. CAN. 0858848.

3,578,316.—DRIVING APPARATUS FOR ARTICLE FEEDERS. MAY 11, 1971. CAN. 0907653.

3,614,090.—DOCUMENT CONVEYOR. OCT. 19, 1971. ARG. 0183554, AUS. 0451766, BEL. 0751308, CAN. 0922330, EGR. 0081784, FRA. 7019911, GRB. 1311766, ITL. 0893688, MEX. 0118182, SPN. 0380271, STZ. 0512751, SWD. 0362150, TIW. 0007678, USR. 0349152, VZL. 0032780.

3,628,408.—STAMP DISPENSER. DEC. 21, 1971. CAN. 0931918, GRB. 1324699, JAP. 0755787.

3,628,786.—DOCUMENT HANDLING APPARATUS. DEC. 21, 1971. CAN. 0942552, GRB. 1329989.

3,630,515.—DOCUMENT HANDLING APPARATUS. DEC. 28, 1971.

3,630,519.—DOCUMENT FEED APPARATUS. DEC. 28, 1971. CAN. 0903779, GRB. 1329747.

3,649,447.—APPARATUS FOR DECURLING A PAPER WEB. MAR. 14, 1972. CAN. 0916185, GRB. 1288846.

3,674,363.—SHEET FEEDING APPARATUS. JULY 4, 1972. ARG. 0176106, ATR. 0307230, AUS. 0447387, BEL. 0734129, DNK. 0131336, FRA. 6919121, GRB. 1263192, ITL. 0866189, MEX. 0112842, SPN. 0368216, STZ. 0501500, SWD. 0356136, TIW. 0006604.

3,804,514.—DUAL FUNCTION DOCUMENT STOP FOR A COPYING DEVICE. APR. 16, 1974. FRA. 7334456, GRB. 1424060.

3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.

3,860,339.—COPYING MACHINE. JAN. 14, 1975.

3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975.

3,874,651.—REGISTRATION EDGE FOR AUTOMATIC DOCUMENT HANDLER. APR. 1, 1975. GRB. 1467791.

3,884,408.—APPARATUS FOR EJECTING A STAPLED SET OF SHEETS SIDEWISE FROM THE COLLATING BINS. MAY 20, 1975.

3,885,782.—SHEET FEEDER. MAY 27, 1975. CAN. 3885782.

3,888,581.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.

3,888,582.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.

3,888,584.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.

3,888,585.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.

3,889,943.—PLATEN TRANSPORT FOR AUTOMATIC DOCUMENT HANDLER. JUNE 17, 1975.

3,900,258.—EXPOSURE APPARATUS. AUG. 19, 1975. AUS. 0474469, CAN. 1004724, GRB. 1424242, ITL. 0993030, SPN. 0418138, SWD. 7311579.

3,901,594.—SEMI-AUTOMATIC DOCUMENT HANDLER. AUG. 26, 1975.

3,909,129.—DOCUMENT FEEDING APPARATUS. SEPT. 30, 1975.

3,915,447.—HORIZONTAL PLATEN BELT TRANSPORT. OCT. 28, 1975.

3,941,376.—AUTOMATIC DOCUMENT HANDLER-ARDRI ADH PLATEN TRANSPORT MOUNTING. MAR. 2, 1976. BEL. 0799234, CAN. 0993906, FRA. 7316540, GRB. 1421427, ITL. 0987317, SPN. 0414541.

3,941,473.—MANUAL ASSIST DOCUMENT FEEDER. MAR. 2, 1976.

3,944,365.—DOCUMENT FEEDING APPARATUS AND LATCHING MECHANISM. MAR. 16, 1976.

3,944,794.—COPYING SYSTEM CONTROL. MAR. 16, 1976. ARG. 0204710, BEL. 0808230, CAN. 1007289, FRA. 7343289, GRB. 1450707, ITL. 1002162, MEX. 0135679, SPN. 0421150, STZ. 0577391, USR. 0543364.

3,947,111.—DOCUMENT FEEDING APPARATUS. MAR. 30, 1976.

3,953,122.—DOCUMENT ORIGINAL HANDLING SYSTEM. APR. 27, 1976.

3,954,259.—DOUBLE BAR SEPARATOR FOR A SHEET RECEIVING TRAY. MAY 4, 1976.

3,959,573.—COMPOSITIONS AND METHODS FOR MAKING BIASABLE MEMBERS. MAY 25, 1976.

3,963,345.—PRE-COLLATION COPYING. JUNE 15, 1976.

3,977,780.—ELECTROSTATIC REPRODUCTION METHOD AND APPARATUS. AUG. 31, 1976.

3,981,498.—NON-UNIFORM CHARGING OF SHEET MATERIAL. SEPT. 21, 1976.

3,982,832.—ELECTROSTATOGRAPHIC COPYING MACHINES. SEPT. 28, 1976.

3,984,099.—AN IMPROVED DOCUMENT FEEDING SYSTEM. OCT. 5, 1976.

3,988,065.—REFLECTIVE DOCUMENT FEEDER. OCT. 26, 1976.

3,997,263.—BI-DIRECTIONAL COPIER OUTPUT. DEC. 14, 1976. BEL. 0839792, SPN. 0445641.

4,000,943.—DUAL PURPOSE DOCUMENT HANDLING SYSTEM. JAN. 4, 1977. BEL. 0837235.

4,004,941.—CLEANING METHOD FOR AUTOMATIC DOCUMENT HANDLER. JAN. 25, 1977.

4,008,956.—DOCUMENT HANDLING SYSTEM FOR PRE-COLLATION COPYING. FEB. 22, 1977. BEL. 0839792, SPN. 0445641.

4,012,140.—COPIER DOCUMENT LOADING SYSTEM. MAR. 15, 1977. BEL. 0839792, SPN. 0445641.

4,017,172.—DOCUMENT FEEDING APPARATUS. APR. 12, 1977.

4,018,523.—REPRODUCING APPARATUS AND PROCESS FOR FORMING MULTIPLE COPIES OF A DOCUMENT. APR. 19, 1977. BEL. 0842928.

4,030,721.—AUTOMATIC MANUSCRIPT DISCHARGING DEVICE FOR COPYING MACHINES. JUNE 21, 1977.

4,033,694.—COPIER DOCUMENT EJECTOR. JULY 5, 1977.

4,034,869.—FLUID MEANS TO LOAD AND UNLOAD A VERTICALLY MOVABLE DOCUMENT STORAGE RACK. JULY 12, 1977.

4,040,615.—ORIGINAL DISCHARGING DEVICE FOR COPIERS. AUG. 9, 1977.

4,043,550.—IMPROVED REGISTRATION MEANS FOR AUTOMATIC DOCUMENT HANDLING APPARATUS. AUG. 23, 1977. BEL. 847626, FRA. 7631994. SPN. 452660.

4,043,664.—INTERLINEAR FEEDER FOR COPYING MACHINE. AUG. 23, 1977.

4,043,665.—COPIER DOCUMENT HANDLER. AUG. 23, 1977.

4,047,812.—DOCUMENT BELT WITH IMPERFORATE BANDS. SEPT. 13, 1977. GER. 7700998.

4,049,255.—APPARATUS FOR FEEDING DOCUMENTS TO AND FROM A COPIER. SEPT. 20, 1977. FRA. 7706823.

4,050,751.—DOCUMENT CAROUSEL. SEPT. 27, 1977.

4,050,816.—DOCUMENT HANDLING SYSTEM. SEPT. 27, 1977. BEL. 839792, SPN. 445641.

4,053,224.—DOCUMENT HANDLING SYSTEM. OCT. 11, 1977.

4,059,260.—DOCUMENT HANDLING APPARATUS. NOV. 22, 1977.

4,062,538.—SPEED REGULATED FLUIDIC SHEET TRANSPORT. DEC. 13, 1977. BEL. 850380.

4,078,786.—AUTOMATIC DOCUMENT RECIRCULATION SYSTEM. MAR. 14, 1978.

4,079,876.—COMPUTER FORMS FEEDER. MAR. 21, 1978.

4,080,063.—COPIER DOCUMENT HANDLING SYSTEM. MAR. 21, 1978.

4,086,007.—DUAL PURPOSE DOCUMENT AND COPY SHEET FEED CASSETTE. APR. 25, 1978.

4,087,172.—DOCUMENT HANDLING APPARATUS. MAY 2, 1978.

4,093,372.—PRE-SEPARATED RECIRCULATING DOCUMENT COPYING SYSTEM. JUNE 6, 1978.

4,097,146.—ORIGINAL HANDLING SYSTEM AND PROCESS. JUNE 27, 1978.

4,099,810.—UPRIGHT DOCUMENT CAROUSEL. JULY 11, 1978.

4,108,547.—DOCUMENT LOADING FOR COPYING. AUG. 22, 1978. BEL. 839792. GRB. 1524101. SPN. 445641.

4,110,028.—DRIVE SYSTEM FOR MULTI-MODE REPRODUCING APPARATUS. AUG. 29, 1978. BEL. 844828.

4,126,817.—SERVO SYSTEM FOR MAINTAINING CONSTANT TENSION ON A WEB. NOV. 21, 1978.

4,132,401.—COPIER DOCUMENT SENSING AND CONTROL SYSTEM. JAN. 2, 1979. GRB. 1523900. USR. 604211.

4,145,041.—AUTOMATIC DOCUMENT HANDLING APPARATUS. MAR. 20, 1979.

4,146,220.—DOCUMENT HANDLING APPARATUS. MAR. 27, 1979.

4,146,326.—DOCUMENT HANDLING APPARATUS AND REPRODUCING MACHINE. MAR. 27, 1979.

4,159,824.—METHOD FOR REVERSING THE DIRECTION OF TRAVEL OF A SHEET. JULY 3, 1979.

4,160,547.—DOCUMENT HANDLING APPARATUS. JULY 10, 1979.

4,184,671.—AUTOMATIC DOCUMENT HANDLER IN DUPLEX COPYING MACHINE. JAN. 22, 1980.

4,185,908.—VERNIER BELT TENSIONING SYSTEM FOR A PHOTOCOPYING MACHINE. JAN. 29, 1980.

4,190,359.—COPIER DOCUMENT HANDLING SYSTEM. FEB. 26, 1980.

Class 10B

3,139,279.—RECORD CARD MAGAZINE. JUNE 30, 1964. CAN. 0717868.
3,180,637.—RECORD CARD FEEDING APPARATUS. APR. 27, 1965. CAN. 0806932.
3,357,574.—SEQUENTIAL CONTROL SYSTEM. DEC. 12, 1967. CAN. 0824898.
3,383,105.—CARD PICK-OFF APPARATUS. MAY 14, 1968. CAN. 0820743, GRB. 1193512, JAP. 0610154.
3,482,917.—CARD TRANSPORT APPARATUS. DEC. 9, 1969. CAN. 0842646, GRB. 1193516.
3,784,303.—AUTOMATIC MICROFICHE COPIER. JAN. 8, 1974. CAN. 1000779, GRB. 1412221.
4,095,732.—METHOD AND APPARATUS FOR ACCURATELY CONTROLLING THE POSITION OF A FILM TRANSPORT DEVICE. JUNE 20, 1978.

Class 10C

3,239,213.—DOCUMENT FEEDER. MAR. 8, 1966. CAN. 0766646, FRA. 1447269, GER. 1243698, GRB. 1087786, ITL. 0761046, JAP. 0497197.
3,506,257.—DOCUMENT FEEDING APPARATUS. APR. 14, 1970. CAN. 0885333, GRB. 1253416.
3,567,214.—SHEET FEEDING AND SEPARATING APPARATUS. MAR. 2, 1971. BEL. 0734128, CAN. 0902124, FRA. 6919122, GER. 1929105, GRB. 1263193, HOL. 0144551, ITL. 0866188, SPN. 0368173, STZ. 0501501, SWD. 6908176.
3,861,671.—LIFTABLE BAIL BAR FOR ALLOWING RETURN OF MULTIPLY SEPARATED SHEETS TO STACK. JAN. 21, 1975.
3,895,790.—MOVABLE BAIL BAR. JULY 22, 1975. BEL. 0815050, CAN. 1009267.
3,936,180.—XEROGRAPHIC APPARATUS WITH SAMPLE PRINT CAPABILITIES. FEB. 3, 1976. BEL. 0809398, ITL. 1006708.
3,968,364.—HEIGHT SENSING DEVICE. JULY 6, 1976.
3,993,300.—AUTOMATIC FEEDER FOR COMPOSITE COPYING. NOV. 23, 1976. BEL. 0815215, GRB. 1467996, STZ. 0561917.
4,025,068.—SHEET FEEDER. MAY 24, 1977.
4,054,284.—PAPER-ANTI-SKEW DEVICE. OCT. 18, 1977.
4,174,102.—IMPROVED SHUT SEPARATING AND FEEDING APPARATUS. NOV. 13, 1979.

Class 10D

3,239,213.—DOCUMENT FEEDER. MAR. 8, 1966. CAN. 0766646, FRA. 1447269, GER. 1243698, GRB. 1087786, ITL. 0761046, JAP. 0497197.
3,495,904.—RADIANT ENERGY PROTECTIVE APPARATUS. FEB. 17, 1970.
3,581,000.—INCREMENTAL STEPPING PAPER DRIVE. MAY 25, 1971.
3,618,123.—FACSIMILE DRUM CONVEYOR. NOV. 2, 1971. ARG. 0181314, BEL. 0743659, CAN. 0918186, FRA. 6944287, GER. 1963786, GRB. 1280340, ITL. 0880304, JAP. 0852728, MEX. 0122967, SPN. 0374915, SWD. 0363457, VZL. 0025438.
3,790,159.—AUTOMATIC DOCUMENT HANDLING DEVICE. FEB. 5, 1974. CAN. 1013377, GRB. 1417793.
3,815,899.—SHEET DELIVERY DEVICE. JUNE 11, 1974. CAN. 0994377, FRA. 7409303, GRB. 1456422.
3,854,715.—CAM. DEC. 17, 1974. CAN. 1007256, GRB. 1456576.

Class 10E

3,288,459.—DOCUMENT FEEDING APPARATUS. NOV. 29, 1966. CAN. 0788345, JAP. 0632541, MEX. 0086958.
3,300,208.—COPY POSITIONING APPARATUS AND METHOD. JAN. 24, 1967. CAN. 0817270, JAP. 0605646, MEX. 0090842.
3,473,035.—DOCUMENT TRANSPORT AND REGISTRATION SYS USING PHOTOCELLS. OCT. 14, 1969. ARG. 0170131, CAN. 0858983, CHL. 0024005, JAM. 0001926, MEX. 0101674, PRU. 0009301, URG. 0009238, VZL. 0023677.
3,510,125.—DOCUMENT REGISTRATION SYSTEM. MAY 5, 1970. BEL. 0726865, CAN. 0897195, FRA. 2000318, GER. 1902112, GRB. 1253417, ITL. 0854755, JAP. 0783473.
3,558,223.—DOCUMENT CENTERING APPARATUS. JAN. 26, 1971.
3,630,611.—DOCUMENT REGISTRATION APPARATUS. DEC. 28, 1971.
3,630,620.—PLATEN COVER FOR COPYING MACHINES. DEC. 28, 1971. CAN. 0921307, GRB. 1309313.
3,642,370.—DOCUMENT PRESENTATION DEVICE. FEB. 15, 1972. GRB. 1206633.
3,724,941.—ELECTROPHOTOGRAPHIC APPARATUS. APR. 3, 1973.
3,741,644.—ORIGINAL POSITION CONFIRMING MEANS FOR DUPLICATING APPARATUS. JUNE 26, 1973.
3,771,082.—COPYING APPARATUS WITH AUXILIARY LIGHT SOURCE FOR ILLUMINATING AN ORIGINAL TO BE REPRODUCED. NOV. 6, 1973.
3,829,082.—AUTOMATIC DOCUMENT HANDLER. AUG. 13, 1974. CAN. 0986958, GRB. 1421425.
3,854,715.—CAM. DEC. 17, 1974, CAN. 1007256, GRB. 1456576.
3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975. CAN. 1004240.
3,877,804.—CORNER REGISTRATION DEVICE FOR DOCUMENT FEEDER. APR. 15, 1975.
3,883,134.—DETECTING AND REMOVING APPARATUS FOR SKEW FED SHEETS. MAY 13, 1975.
3,915,447.—HORIZONTAL PLATEN BELT TRANSPORT. OCT. 28, 1975.
3,984,098.—PNEUMATIC REGISTRATION AND CLAMPING APPARATUS. OCT. 5, 1976. BEL. 0848824.
3,984,099.—AN IMPROVED DOCUMENT FEEDING SYSTEM. OCT. 5, 1976.
3,990,794.—COPYING MACHINE. NOV. 9, 1976. STZ. 0587508.
4,026,542.—DUAL REGISTRATION APPARATUS. MAY 31, 1977.
4,029,411.—VARIABLE MAGNIFICATION COPIER. JUNE 14, 1977. BEL. 0839792, SPN. 0445641.
4,033,574.—DOCUMENT HANDLING APPARATUS. JULY 5, 1977.
4,033,694.—COPIER DOCUMENT EJECTOR. JULY 5, 1977.
4,043,550.—IMPROVED REGISTRATION MEANS FOR AUTOMATIC DOCUMENT HANDLING APPARATUS. AUG. 23, 1977. BEL. 847626, FRA. 7631994, SPN. 452660.
4,043,665.—COPIER DOCUMENT HANDLER. AUG. 23, 1977.
4,047,812.—DOCUMENT BELT WITH IMPERFORATE BANDS. SEPT. 13, 1977. GER. 7700998.
4,050,688.—ORTHOGONAL DOCUMENT HANDLING APPARATUS. SEPT. 27, 1977.
4,054,285.—APPARATUS FOR REGISTERING AND INVERTING SHEETS. OCT. 18, 1977.
4,055,340.—ASSISTED PNEUMATIC TRANSPORT AND REGISTRATION APPARATUS. OCT. 25, 1977. BEL. 848823.
4,062,538.—SPEED REGULATED FLUIDIC SHEET TRANSPORT. DEC. 13, 1977. BEL. 850380.
4,066,254.—THREE-WAY PNEUMATIC REGISTRATION APPARATUS. JAN. 3, 1978.
4,073,001.—APPARATUS FOR NEUTRALIZING AND REGISTERING AN ELECTROSTATICALLY CHARGED SHEET. FEB. 7, 1978.
4,076,233.—DOCUMENT HANDLING APPARATUS. FEB. 28, 1978. BEL. 847625, FRA. 7631999, SPN. 452661.
4,090,704.—REGISTRATION STATION. MAY 23, 1978.
4,097,146.—ORIGINAL HANDLING SYSTEM AND PROCESS. JUNE 27, 1978.
4,116,431.—METHOD FOR TRANSPORTING AND REGISTERING STACKED SHEETS. SEPT. 26, 1978.
4,124,205.—DOCUMENT HANDLING. NOV. 7, 1978.
4,130,274.—PNEUMATIC REGISTRATION APPARATUS. DEC. 19, 1978. BEL. 847912. SAF. 6401.
4,143,960.—RETRACTABLE SUPPORT MEMBER. MAR. 13, 1979.
4,146,219.—DOCUMENT TRANSPORT APPARATUS. MAR. 27, 1979. GRB. 1529698. SPN. 452659.

Class 10F

3,288,464.—CARD INVERTING APPARATUS. NOV. 29, 1966. CAN. 0803316, JAP. 0547200.
3,408,140.—DOCUMENT HANDLING APPARATUS. OCT. 29, 1968. CAN. 0842643, GRB. 1143062.
3,416,791.—DOCUMENT INVERTING APPARATUS. DEC. 17, 1968. CAN. 0853562, GRB. 1210564, JAP. 0648074.
3,844,654.—DUPLEX COPYING SYSTEM. OCT. 29, 1974. FRA. 7340246, GRB. 1445854.
3,862,802.—SHEET REVERSING APPARATUS AND A DUPLEX REPRODUCING APPARATUS EMPLOYING SAME. JAN. 28, 1975. BEL. 0818894.
3,926,338.—THERMALLY INSENSITIVE PARTICLE CONCENTRATION CONTROLLER. DEC. 16, 1975.
3,980,406.—DUPLEX IMAGING SYSTEM. SEPT. 14, 1976.
4,040,616.—SHEET TURN AROUND INVERTER. AUG. 9, 1977. FRA. 7701111.
4,054,285.—APPARATUS FOR REGISTERING AND INVERTING SHEETS. OCT. 18, 1977.
4,089,515.—DOCUMENT STORAGE AND TRANSPORT APPARATUS. MAY 16, 1978. BEL. 850379.

4,111,547.—DUPLEX DOCUMENT COPYING. SEPT. 5, 1978.
4,184,671.—AUTOMATIC DOCUMENT HANDLER IN DUPLEX COPYING MACHINE. JAN. 22, 1980.
4,190,354.—COPIER JOB RECOVERY SYSTEM. FEB. 26, 1980.

Class 10G

3,419,265.—DOCUMENT STACKER APPARATUS. DEC. 31, 1968. ARG. 0171423, CAN. 0833415, CHL. 0024006, JAM. 0001859, MEX. 0100967, PRU. 0001930, URG. 0009140, VZL. 0023736.
3,460,825.—FAN FOLD STACKING APPARATUS. AUG. 12, 1969. CAN. 0855586, GRB. 1205418.
3,497,207.—SORTING APPARATUS FOR DOCUMENTS. FEB. 24, 1970. BEL. 0727203, CAN. 0895731, FRA. 6900957, GRB. 1245841, HOL. 0148006, ITL. 0854588.
3,630,517.—COUNTER STACKER. DEC. 28, 1971.
3,729,188.—DOCUMENT STACKER APPARATUS. APR. 24, 1973. CAN. 1000311, FRA. 0701711, GRB. 1303165, ITL. 0893040.
3,865,480.—ELECTROSTATIC CONTROL OF FAN FOLD PAPER STACKING. FEB. 11, 1975.
4,017,066.—SET SEPARATOR. APR. 12, 1977.
4,033,579.—AN OFFSET STACKER. JULY 5, 1977.
4,093,372.—PRE-SEPARATED RECIRCULATING DOCUMENT COPYING SYSTEM. JUNE 6, 1978.
4,132,400.—APPARATUS FOR ALIGNING A STACK OF SHEETS. JAN. 2, 1979.
4,166.614.—JOGGING AND NORMAL FORCE FOR SHEET FEEDING. SEPT. 4, 1979. BEL. 869792.

Class 10H

3,467,371.—SHEET DISTRIBUTOR. SEPT. 16, 1969. ARG. 0168293, ATR. 0294140, AUS. 0423257, BEL. 0702898, CAN. 0925803, CHL. 0023102, CLB. 0017542, DNK. 0124250, EIR. 0031306, FIN. 0047869, FRA. 1541084, GRB. 1193513, GRK. 0038675, IND. 0112000, ISR. 0028519, ITL. 0813836, JAP. 0645588, LXB. 0054335, MEX. 0099952, NOR. 0124920, NZL. 0149788, PAK. 0118964, PLP. 0006507, PRU. 0009477, PTG. 0048210, SAF. 0674986, SPN. 0344349, STZ. 0480253, SWD. 0337384, TRK. 0015492, URG. 0008974, VZL. 0026276.
3,815,896.—AUTOMATIC DOCUMENT HANDLER. JUNE 11, 1974. BEL. 0797889, CAN. 0984863, FRA. 7316287, GRB. 1421426, ITL. 0987316, SPN. 0414486.
3,884,408.—APPARATUS FOR EJECTING A STAPLED SET OF SHEETS SIDEWISE FROM THE COLLATING BINS. MAY 20, 1975.
3,907,277.—METHOD AND DEVICE FOR REMOVING DOCUMENTS FROM A PLATEN. SEPT. 23, 1975.
3,913,467.—COLLATING APPARATUS. OCT. 21, 1975.
3,944,207.—LIMITLESS SORTER. MAR. 16, 1976.
3,944,366.—SLIDING PLATEN COVER APPARATUS. MAR. 16, 1976.
3,963,345.—PRE-COLLATION COPYING. JUNE 15, 1976. BEL. 0839792, SPN. 0445641.
3,997,263.—BI-DIRECTIONAL COPIER OUTPUT. DEC. 14, 1976. BEL. 0839792, SPN. 0445641.
4,008,956.—DOCUMENT HANDLING SYSTEM FOR PRE-COLLATION COPYING. FEB. 22, 1977. BEL. 0839792, SPN. 0445641.
4,012,140.—COPIER DOCUMENT LOADING SYSTEM. MAR. 15, 1977. BEL. 0839792, SPN. 0445641.
4,050,816.—DOCUMENT HANDLING SYSTEM. SEPT. 27, 1977. BEL. 839792, SPN. 445641.
4,108,547.—DOCUMENT LOADING FOR COPYING. AUG. 22, 1978. BEL. 839792. GRB. 1524101. SPN. 445641.
4,120,580.—COLLATING SYSTEM FOR SLIDE REPRODUCTION. OCT. 17, 1978.

Class 10H 6K

4,212,457.—PRE/POST-COLLATION COPYING SYSTEM. JULY 15, 1980.

Class 10I

3,495,904.—RADIANT ENERGY PROTECTIVE APPARATUS. FEB. 17, 1970.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,609,737.—METHOD AND APPARATUS FOR ARTICLE DETECTION UTILIZING CORONA DISCHARG. SEPT. 28, 1971. CAN. 0872468, GER. 1932248, GRB. 1259998, JAP. 0657911.
3,672,760.—XEROGRAPHIC PLATE TRANSPORTING MECHANISM. JUNE 27, 1972. CAN. 0939555, GRB. 1359888.
3,674,363.—SHEET FEEDING APPARATUS. JULY 4, 1972. ARG. 0176106, ATR. 0307230, AUS. 0447387, BEL. 0734129, DNK. 0131336, FRA. 6919121, GRB. 1263192, ITL. 0866189, MEX. 0112842, SPN. 0368216, STZ. 0501500, SWD. 0356136, TIW. 0006604.
3,697,063.—DOCUMENT HANDLING APPARATUS. OCT. 10, 1972. GRB. 1369618.
3,744,047.—SUPERPOSED SHEET DETECTION. JULY 3, 1973. CAN. 0985762, FRA. 7231694, GRB. 1396560, ITL. 0967501.
3,748,088.—FUSER CONTROL APPARATUS. JULY 24, 1973.
3,778,618.—PHOTODETECTION OF NON-OPAQUE OBJECTS TRANSPRTD ALONG A CONVEYOR BY USE OF A LIGHT BLCKING OPAQU. DEC. 11, 1973. GRB. 1406170.
3,790,158.—AUTOMATIC DOCUMENT HANDLER. FEB. 5, 1974. GRB. 1421428.
3,894,513.—COPYING MACHINE WITH BEAD PICKOFF ROLLER. JULY 15, 1975. FRA. 7342586, GRB. 1441288.
3,945,546.—ZIG ZAG FOLDED STRIP BOTTOM FEEDER. MAR. 23, 1976.
4,116,431.—METHOD FOR TRANSPORTING AND REGISTERING STACKED SHEETS. SEPT. 26, 1978.
4,132,401.—COPIER DOCUMENT SENSING AND CONTROL SYSTEM. JAN. 2, 1979. GRB. 1523900. USR. 604211.
4,203,586.—MULTIFEED DETECTOR. MAY 20, 1980.

Class 12

4,027,138.—A FUSER RELEASE MATERIAL DISPENSER. MAY 31, 1977.
4,179,209.—MULTICOLOR LINE SCREEN. DEC. 18, 1979.

Class 12A

3,384,488.—POLYCHROMATIC PHOTOELECTROPHORETIC IMAGING COMPOSITION. MAY 21, 1968.
3,384,565.—PROCESS OF PHOTOELECTROPHORETIC COLOR IMAGING. MAY 21, 1968. ARG. 0149921, ATR. 0304268, AUS. 0414156, BEL. 0667116, BRA. 0087920, CAN. 0867678, CHL. 0021697, CLB. 0014706, FRA. 1450843, GER. 1497243, GRB. 1124626, GRK. 0030605, IND. 0119647, ISR. 0023973, ITL. 0744030, JAP. 681941, LXB. 0049058, MEX. 0091899, NOR. 0128733, NZL. 0142323, PPU. 0009538, PTG. 0044324, SAF. 653922, SPN. 0321858, STZ. 0481409, SWD. 6509579, URG. 0009540. VZL. 0017273.
3,384,566.—METHOD OF PHOTOELECTROPHORETIC IMAGING. MAY 21, 1968.
3,734,610.—MICROFICHE VIEWER-COPIER WITH BILLING DATA STORAGE. MAY 22, 1973. CAN. 1003025.
3,759,611.—MICROIMAGE RANSOM ACCESS AND RETRIEVAL PRINTER. SEPT. 18, 1973. CAN. 0987156, GRB. 1427017.

Class 12B

3,383,993.—PHOTOELECTROPHORETIC IMAGING APPARATUS. MAY 21, 1968. ARG. 0165160, AUS. 0419734, BEL. 0692048, CAN. 0866143, FRA. 1507051, GRB. 1158301, GRK. 0033285, HOL. 0150926, ITL. 0862555, LXB. 0052738, MEX. 0096357, PTG. 0044324, SAF. 0067022, SPN. 0335121, STZ. 0510901, VZL. 0024450.
3,610,748.—PHOTOELECTROPHORETIC IMAGING SYSTEM. OCT. 5, 1971. BEL. 0752438, CAN. 0922569, FRA. 7023045, GRB. 1319532, ITL. 0894621, JAP. 0739527.
3,656,847.—ELEVATOR MECHANISM. APR. 18, 1972.
3,663,396.—KINESCOPE PHOTOELECTROPHORETIC IMAGING METHODS AND SYSTEMS. MAY 16, 1972. ARG. 0196858, BEL. 0762417, CAN. 0935965, FRA. 7104350, GRB. 1345571, ITL. 0918121, JAP. 0743838, MEX. 0131834.
3,697,409.—BELT ELECTRODE IMAGING SYSTEM. OCT. 10, 1972. ARG. 0183572, BEL. 0760077, BRA. 7023343, CAN. 0937803, FRA. 7045072, GRB. 1339734, ITL. 0913368, JAP. 0752721, MEX. 0119368, VZL. 0032930.
3,844,779.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A BELT ELECTRODE. OCT. 29, 1974.
4,043,654.—DISPLAY SYSTEM. AUG. 23, 1977.
4,043,655.—PHOTOELECTROPHORETIC IMAGING REPRO- DUCTION DEVICE. AUG. 23, 1977.

Class 12C

3,427,242.—APPARATUS FOR CONTINUOUS PHOTOELECTROPHORETIC IMAGING. FEB. 11, 1969. BEL. 0743902, CAN. 0851701, FRA. 1521727, GER. 1572385, GRB. 1185932, ITL. 0794269, JAP. 0580245, MEX. 0097005.
3,474,019.—PHOTOELECTROPHORETIC IMAGING MTD INC. CONTACTNG IMGNG SUSPNSN W/ ALG SFC

OF FLEXIBLE ELECTRODE. OCT. 21, 1969. AUS. 0418224, BEL. 0692912, BRA. 6678842, CAN. 0834679, GRE. 0033301, LXB. 0052730, MEX. 0090286, PTG. 0046984, SAF. 0670024, SPN. 0335454.

3,551,320.—IMAGING APPARATUS. DEC. 29, 1970.

3,600,081.—IMAGING APPARATUS. AUG. 17, 1971. ARG. 0192211, ATR. 0324839, AUS. 0455820, BEL. 0758903, CAN. 0936732, CZC. 0164288, EGR. 0090482. FRA. 7041652, GRB. 1335990, ITL. 0909307, JAP. 0751878, MEX. 0122272, PNM. 0002094, SPN. 0385453, STZ. 0518582, SWD. 0362717, TIW. 0008461, USR. 0412697, VZL. 0032926.

3,609,028.—IMAGING APPARATUS. SEPT. 28, 1971. ARG. 0186570, ATR. 0319749, AUS. 0455572, BEL. 0758806, CAN. 0935012, EGR. 0086977, FRA. 7041648, GRB. 1335988, ITL. 0909306, MEX. 0121331, PLD. 0082852, PNM. 0002167, SPN. 0385452, STZ. 0518580, SWD. 0361753, TIW. 0007385, USR. 0465806, VZL. 30683.

3,622,691.—HIGH SPEED LIGHT RESPONSIVE TRANSFORM COMPUTER FOR A LIGHT-SENSITIVE PRINTING SYSTEM. NOV. 23, 1971. CAN. 0915813, GRB. 1335222, JAP. 0774709.

3,642,365.—AUTOMATED IMAGING MACHINE. FEB. 15, 1972. ARG. 0183571, ATR. 0324123, AUS. 0456428, BEL. 0758902, CAN. 0937440, EGR. 0091986, FRA. 7041647, GRB. 1337145, ITL. 0909311, JAP. 0758463, MEX. 0120289, PLD. 0082861, PNM. 0002255, SPN. 0385457. STZ. 0544327, SWD. 0367493, TIW. 0007386.

3,642,606.—APPARATUS FOR IMAGE FORMATION ON THE INSIDE OF A CYLINDER. FEB. 15, 1972. ARG. 0183573, BEL. 0760749, BRA. 7022094, CAN. 0938490, FRA. 7047632, GRB. 1339578, ITL. 0913902, JAP. 0752722, MEX. 0119589, VZL. 0032929.

3,644,035.—FLAT PLATE TRAVELING ROLLER IMAGING. FEB. 22, 1972. ARG. 0183670, AUS. 0456429, BEL. 0758904, BRA. 7023406, CAN. 0923356, EGR. 0090280, FRA. 7041653, GRB. 1335051, ITL. 0909308, JAP. 0751879, MEX. 0119530, PLD. 0082860, SPN. 0385454, STZ. 0528763, SWD. 0367074, TIW. 0008460, USR. 0404290, VZL. 30682.

3,645,616.—PHOTOELECTROPHORETIC IMAGE TRANSFER APPARATUS. FEB. 29, 1972. CAN. 0949049, GRB. 1337417, JAP. 783768.

3,647,290.—PHOTOELECTROPHORETIC IMAGING SYSTEM. MAR. 7, 1972. ARG. 0184762, AUS. 0454820, BEL. 0058902, CAN. 0939954, EGR. 0090483, FRA. 7061651, GER. 1337416, GRB. 1337416, ITL. 0909312, JAP. 0751880, MEX. 0119752, SPN. 0385458, STZ. 0530662, SWD. 0366850, TIW. 0007384, USR. 0419062, VZL. 30685.

3,667,842.—IMAGING APPARATUS. JUNE 6, 1972. ARG. 0193347, BEL. 0768538, CAN. 0953559, FRA. 7122750, GRB. 1350395, ITL. 0927384, MEX. 0123298.

3,703,335.—MULTIPLE EXPOSURE IMAGING APPARATUS. NOV. 21, 1972. BEL. 0760457, CAN. 0968605, FRA. 7047141, GRB. 1339550, ITL. 0913636, JAP. 0759479.

3,719,484.—PHOTOELECTROPHORETIC IMAGING METHOD. MAR. 6, 1973. CAN. 0957890, GRB. 1369701.

3,728,018.—IMAGING APPARATUS. APR. 17, 1973. CAN. 0924156, GRB. 1335697.

3,800,743.—MATERIALS APPLICATION APPARATUS. APR. 2, 1974.

3,860,336.—PHOTOELECTROPHORETIC IMAGING MACHINE AND APPTS FOR CONTACTING A ROLLER TO A SURFACE TO BE CONTACT. JAN. 14, 1975.

3,860,337.—MULTIPLE EXPOSURE METHOD AND APPARATUS. JAN. 14, 1975. CAN. 0957890, GRB. 1369701.

3,990,043.—CHARACTER CODING AND RECOGNITION SYSTEM. NOV. 2, 1976.

4,006,982.—PHOTOELECTROPHORETIC CONCURRENT PROCESS CYCLING. FEB. 8, 1977. BEL. 0841077.

4,009,466.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 22, 1977.

4,066,452.—VELOCITY COMPENSATION FOR BEAD BYPASS. JAN. 3, 1978.

4,084,896.—PHOTOELECTROPHORETIC WEB IMAGING APPARATUS. APR. 18, 1978. BEL. 841077, FRA. 7612178.

Class 12D

3,448,025.—PHOTOELECTROPHORETIC IMAGING SYSTEM UTILIZING A PROGRAMMED POTENTIAL APPLICATION. JUNE 3, 1969. ARG. 0167580, AUS. 0417981. BEL. 0719188, CAN. 0875492, FRA. 0095530, GER. 1797123, GRB. 1149666, ITL. 0890086, MEX. 0100805, VZL. 0025946.

3,485,738.—PHOTOELECTROPHORETIC IMG PROCESS EMPLOYNG LAYER OF INSULATNG LIQUID TO IMPROVE IMAGE QUALITY. DEC. 23, 1969. AUS. 0431891, BEL. 0743640, CAN. 0850591, GER. 1522751, GRB. 1174831, JAP. 0578397.

3,565,614.—IMAGE TRANSFER. FEB. 23, 1971. ARG. 0157773, AUS. 0413930, BEL. 0696853, CAN. 0890362, FRA. 1520919, GER. 1572384, GRB. 1185931, ITL. 0801198, JAP. 0586922, MEX. 0099070, SPN. 0349966, STZ. 0482230, SWD. 0332754, VZL. 0024013.

3,582,205.—IMAGING APPARATUS. JUNE 1, 1971.

3,616,398.—PHOTOELECTROPHORETIC IMAGING COMPOSITION CONTAINING B-CAROTENE. OCT. 26, 1971.

3,657,103.—ELECTRODE IMAGING SYSTEM. APR. 18, 1972. CAN. 0890360, GRB. 1309663, JAP. 0731609.

3,697,407.—PREVENTION OF ARCING IN AN ELECTRODE IMAGING SYSTEM. OCT. 10, 1972. CAN. 0884225, GRB. 1309127, JAP. 0731608.

3,697,408.—IMAGING SYSTEM. OCT. 10, 1972. CAN. 0890361, GRB. 1312733, JAP. 0731610.

3,708,286.—PHOTOELECTROPHORETIC IMAGING WITH ULTRASONIC VIBRATION DURING IMAGING. JAN. 2, 1973. ARG. 0174613, ATR. 0293874, AUS. 0455712, BEL. 0739747, CAN. 0922141, FRA. 6933738, GER. 1949416, GRB. 1279285, HOL. 0146950, ITL. 0877873, JAP. 0709042, MEX. 0108820.

3,853,556.—METHOD FOR ELIMINATING ELECTRICAL ARCING DURING PHOTOELECTROPHORETIC IMAGING. DEC. 10, 1974.

Class 12E

3,535,221.—PHOTOELECTROPHORETIC IMAGING SYSTEM EMPLOYING A PHOTOCONDUCTOR COATING FOR THE BLOCKING ELECTRO. OCT. 20, 1970. ARG. 0176485, AUS. 0448560, BEL. 0722301, CAN. 0891971, FRA. 1587938, GER. 1802988, GRB. 1236619, ITL. 0845022, JAP. 0693378, MEX. 0108364, VZL. 0023742.

3,595,771.—METHOD OF REMOVING ACCUMULATED CHARGES IN PHOTOELECTROPHORETIC IMAGING. JULY 27, 1971. ARG. 0198476, ATR. 0302041, AUS. 0448837, BEL. 0737549, CAN. 0922955, FRA. 6927969, GER. 1941463, GRB. 1267255, ITL. 0869935, JAP. 0704156, SWD. 0341726.

3,639,224.—PHOTOELECTROPHORETIC IMAGING SYSTEM. FEB. 1, 1972. CAN. 0922568, GRB. 1313683, JAP. 0739526.

3,657,103.—ELECTRODE IMAGING SYSTEM. APR. 18, 1972. CAN. 0890360, GRB. 1309663, JAP. 0731609.

3,669,872.—IMAGING SYSTEM. JUNE 13, 1972.

3,775,107.—IMAGING SYSTEM. NOV. 27, 1973.

3,859,576.—HIGH PERFORMANCE BLOCKING ELECTRODE FOR ELECTROPHOTOPHORESIS. JAN. 7, 1975. BEL. 0810802, ITL. 1006354.

3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. FEB. 18, 1975. BEL. 0815546, CAN. 1009503, FRA. 7418641, GRB. 1448386, ITL. 1012842, SPN. 0426760.

3,956,524.—METHOD FOR THE PREPARATION OF ELECTROSTATOGRAPHIC AND PHOTORECEPTORS. MAY 11, 1976.

3,966,466.—PHOTOELECTROPHORETIC IMAGING PROCESS USING DARK CHARGE INJECTING AGENT ON BLOCKING ELECTRODE. JUNE 29, 1976.

3,967,961.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING A DARK CHARGE INJECTING AGENT-AKLYD RESIN COATING. JULY 6, 1976.

3,980,477.—PHOTOELECTROPHORESIS WITH DARK CHARGE INJECTING ELEMENT. SEPT. 14, 1976.

Class 12F

3,695,755.—PHOTOELECTROPHORETIC CAMERA. OCT. 3, 1972. CAN. 0958580, GRB. 1359694.

3,702,289 —PHOTOELECTROPHORETIC PROC-ESS AND APPARATUS. NOV. 7, 1972. CAN. 0958579, GRB. 1359695.

3,705,766.—PHOTOELECTROPHORETIC APPARATUS. DEC. 12, 1972. CAN. 0955100, GRB. 1359862.

Class 12G

3,655,550.—ELECTROSTATIC PIGMENT FILTER. APR. 11, 1972.

3,656,200.—CLEANING APPARATUS. APR. 18, 1972.

3,658,687.—APPARATUS FOR FORMING IMAGES WITH APPLICATOR SHEARING SMOOTHING AND CLEANING MEANS. APR. 25, 1972. CAN. 0916433, GRB. 1337149, JAP. 0751881.

3,659,302.—CLEANING APPARATUS. MAY 2, 1972.

3,673,632.—CLEANING APPARATUS. JULY 4, 1972.

3,686,035.—CLEANING APPARATUS. AUG. 22, 1972. CAN. 0925660, GRB. 1335989.

3,821,027.—METHOD OF CLEANING ACCUMULATED MATERIAL FROM A SLOT. JUNE 28, 1974.
3,919,737.—CLEANING APPARATUS. NOV. 18, 1975.
3,945,724.—VELOCITY COMPOSITION FOR BEAD BYPASS. MAR. 23, 1976.
3,950,088.—VELOCITY COMPENSATION FOR BEAD BYPASS WITH SPEED REDUCTION. APR. 13, 1976.
3,986,772.—BEAD BYPASS. OCT. 19, 1976.
3,988,060.—BEAD BYPASS SPEED REDUCTION. OCT. 26, 1976.
3,989,365.—MOTION COMPENSATION FOR BEAD BYPASS. NOV. 2, 1976.
4,066,452.—VELOCITY COMPENSATION FOR BEAD BYPASS. JAN. 3, 1978.

Class 12H

3,505,131.—PROCESS FOR THE PREPARATION OF A CUPROUS IODIDE CONDUCTIVE FILM. APR. 7, 1970. CAN. 0876074, GER. 1800653, GRB. 1244012, JAP. 0615874.
3,623,680.—CLUTCH/BRAKE MECHANISM. NOV. 30, 1971.
3,623,805.—DRIVE MECHANISM FOR IMAGING APPARATUS. NOV. 30, 1971.
3,628,859.—IMAGING MACHINE IMPROVEMENT. DEC. 21, 1971. BEL. 0760455, CAN. 0937436, FRA. 7047139, GRB. 1339549, ITL. 0913635, JAP. 0764505.
3,630,615.—METHOD AND APPARATUS FOR TRANSPORTING SUPPORT MATERIAL. DEC. 28, 1971.
3,630,884.—TRANSPARENT ELECTRODE IMAGING IMPROVEMENT. DEC. 28, 1971. CAN. 0890359, GRB. 1313696, JAP. 0739525.
3,639,049.—COPY SYSTEM. FEB. 1, 1972.
3,640,616.—OPAQUE ILLUMINATION AND SCANNING SYSTEM. FEB. 8, 1972. CAN. 0926674, GRB. 1337418, JAP. 0731615.
3,647,294.—MATERIALS APPLICATION AND CLEANING APPARATUS FOR XEROGRAPHIC APPARATUS. MAR. 7, 1972. CAN. 0913355, GRB. 1337146, JAP. 0759478.
3,654,654.—CLEANING APPARATUS. APR. 11, 1972. CAN. 0925257, GRB. 1335850, JAP. 0791054.
3,673,632.—CLEANING APPARATUS. JULY 4, 1972.
3,681,064.—PHOTELCTROPHRTC IMNG PROCS EMPLYNG MULTI-COMPNT ELCTRCLY PHOTOSNTV PARTICLE. AUG. 1, 1972.
3,685,897.—PHOTOELECTROPHORETIC APPARATUS USING PYRAMID GEARS. AUG. 22, 1972. CAN. 0957542.
3,687,109.—MATERIALS APPLICATION APPARATUS. AUG. 29, 1972. CAN. 0915907, GRB. 1337148.
3,697,167.—OPTICAL PROJECTION APPARATUS. OCT. 10, 1972. BEL. 0772913, CAN. 0955090. FRA. 7134731, GRB. 1316023, ITL. 0936735.
3,703,459.—LIQUID APPLICATOR. NOV. 21, 1972.
3,718,393.—IMAGING APPARATUS. FEB. 27, 1973.
3,722,993.—MATERIALS APPLICATION APPARATUS. MAR. 27, 1973.
3,730,620.—FOCUSING METHOD. MAY 1, 1973.
3,737,221.—ROTATIONAL DRIVE MECHANISM. JUNE 5, 1973.
3,744,897.—TRANSPARENT ELECTRODE FOR ELECTROPHORETIC IMAGING. JULY 10, 1973.
3,769,850.—PHOTOELECTROPHORETIC APPARATUS USING PYRAMID GEARS. NOV. 6, 1973.
3,776,628.—PHOTOELECTROPHORETIC IMAGING SYSTEM. DEC. 4, 1973.
3,784,294.—IMAGE DENSITY CONTROL. JAN. 8, 1974.
3,840,299.—PHOTOELECTROPHORETIC IMAGING APP FOR VARYING ADVANCING RATE OF VELOCITY OF ROLLER ELECTRODES. OCT. 8, 1974.
3,844,651.—PHOTELCTRPHRTC IMG APP FOR CONTRLNG TIME INTRVL OF SUCSSV ROLLR ELCTRDS LEAVNG AND ENTERNG IMG RE. OCT. 29, 1974.
3,920,330.—ELECTROPHORETIC IMAGING APPARATUS. NOV. 18, 1975. BEL. 0777719, CAN. 0961334, FRA. 7201005, GRB. 1376241, ITL. 0946357.
3,944,353.—BACKGROUND REDUCTION. MAR. 16, 1976.
3,950,640.—LAMP CONTROL AND LAMP SWITCH CIRCUIT FOR CONTROLLING LIGHT BALANCE. APR. 13, 1976.
3,952,700.—LIQUID APPLICATOR. APR. 27, 1976.
3,954,465.—ELECTROPHORETIC IMAGING METHODS. MAY 4, 1976. BEL. 0777719, CAN. 0961334, FRA. 7201005, GRB. 1376241, ITL. 0946357.
3,957,510.—OVERFLOW PREVENTION FOR LIQUID BETWEEN FLEXIBLE LAYERS ON A SOLID SURFACE. MAY 18, 1976.
3,981,459.—PHOTOELECTROPHORETIC ELECTROSTATIC TACKING CAPSTAN WEB TENSION SYS. SEPT. 21, 1976.
3,982,710.—PHOTOELECTROPHORETIC WEB TENSION SYSTEM. SEPT. 28, 1976.
3,985,434.—PHOTOELECTROPHORETIC PIGMENT DISCHARGING WITH AC COROTRON OR UV ILLUMINATION. OCT. 12, 1976.
3,989,366.—PHOTOELECTROPHORETIC IMAGING APPARATUS HAVING A DEVICE FOR INCREASING THE FRICTION FORCE BETWEE. NOV. 2, 1976. BEL. 0841080.
3,989,367.—APPARATUS FOR CONTACTING A ROLLER TO A SURFACE TO BE CONTACTED. NOV. 2, 1976.
3,991,992.—PHOTOELECTROPHORETIC WEB MACHINE SERVO DRIVE SYSTEM. NOV. 16, 1976. BEL. 0841079.
4,049,343.—COMBINATION IMAGING AND GROUNDING ROLLER. SEPT. 20, 1977. BEL. 841076, FRA. 7612176.
4,059,443.—ELECTRICAL INFORMATION STORAGE SYSTEM. NOV. 22, 1977.
4,073,583.—PHOTOELECTROPHORETIC HEAT & PRESSURE TRANSFER MECHANISMS. FEB. 14, 1978. BEL. 841078, FRA. 7612171.
4,084,896.—PHOTOELECTROPHORETIC WEB IMAGING APPARATUS. APR. 18, 1978. BEL. 841077, FRA. 7612178.

Class 12I

3,681,064.—PHOTELCTROPHRTC IMNG PROCS EMPLYNG MULTI-COMPNT ELCTRCLY PHOTOSNTV PARTICLE. AUG. 1, 1972.
3,820,987.—PHOTOELECTROPHORETIC IMAGING WITH FIXING ON A SEPARATE ELECTRODE. JUNE 28, 1974.
4,172,721.—DYE-AMPLIFIED IMAGING PROCESS. OCT. 30, 1979. AUS. 494739, BEL. 822400, CAN. 1033041, FRA. 7438506, GER. 7438730, GRB. 1484706, ITL. 1025877, SPN. 432205, SWD. 74144650.

Class 12J

3,642,364.—TRANSFER APPARATUS. FEB. 15, 1972. AUS. 0455718, BEL. 0758808, CAN. 0918412, CZC. 0164906, EGR. 0087486, FRA. 7041650, GRB. 1336720, HUN. 0169308, ITL. 0909310, PLD. 0082862, SPN. 0385456, STZ. 0518581, USR. 0406387.
3,791,823.—PHOTOELECTROPHORETIC IMAGING TRANSFER METHOD. FEB. 12, 1974.
3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.
3,897,143.—IMAGING SYSTEM. JULY 29, 1975.
4,065,304.—METHOD FOR FIXING INK IMAGES. DEC. 27, 1977. BEL. 848487.

Class 12K

3,510,419.—PHOTOELECTROPHORETIC IMAGING METHOD. MAY 5, 1970. ARG. 0165519, AUS. 0425666, BEL. 0717829. CAN. 0876044, FRA. 0095234, GRB. 1242262, ITL. 0896927, JAP. 0657876, MEX. 0102064, PNM. 0001975, PRU. 0010174, VZL. 0023693.
3,561,864.—ELECTROPHORETIC COATING DEVICE. FEB. 9, 1971. ARG. 0174608, ATR. 0302815, AUS. 0447649, BEL. 0739544, CAN. 0890357, FRA. 6933095, GER. 1949861, GRB. 1277806, ITL. 0873705, JAP. 0686763, MEX. 0113013.
3,609,029.—MATERIALS APPLICATION APPARATUS. SEPT. 28, 1971. BEL. 0772565, CAN. 0953097, FRA. 7133987, GRB. 1366382, ITL. 0936510.
3,619,053.—PHOTOELECTROPHORETIC IMAGING SYSTEM. NOV. 9, 1971. GRB. 1324102, JAP. 0759477.
3,620,948.—PHOTOELECTROPHORETIC IMAGING SYSTEM EMPLOYING PRELIMINARY ELECTROPHRIC DSPSTN OF IMAGNG SUSPENS. NOV. 16, 1971. ATR. 0326480, AUS. 0447819, BEL. 0739754, CAN. 0899137, FRA. 6933734, GRB. 1280027, HOL. 0146951, ITL. 0877872, JAP. 0709041, MEX. 0114889, SPN. 0372065, STZ. 0508232, SWD. 0341929, VZL. 0015070.
3,645,874.—IMAGE DENSITY CONTROL IN PHOTOELECTROPHORETIC IMAGING. FEB. 29, 1972. BEL. 0756899, CAN. 0922957, FRA. 7035803, GRB. 1331621, ITL. 0908434, JAP. 0743836.
3,658,687.—APPARATUS FOR FORMING IMAGES WITH APPLICATOR SHEARING SMOOTHING AND CLEANING MEANS. APR. 25, 1972. CAN. 0916433, GRB. 1337149, JAP. 0751881.
3,695,755.—PHOTOELECTROPHORETIC CAMERA. OCT. 3, 1972. CAN. 0958580, GRB. 1359694.
3,744,896.—IMAGING SYSTEM. JULY 10, 1973.

3,769,009.—INKING SYSTEM FOR LIQUID PARTICLE MIGRATION ON AUTOMATIC MACHINE. OCT. 30, 1973. HOL. 7216013.
3,938,088.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 10, 1976.
3,944,353.—BACKGROUND REDUCTION. MAR. 16, 1976.
3,968,271.—COATING APPARATUS AND USE THEREOF. JULY 6, 1976.
3,993,020.—BLADE APPLICATOR ASSEMBLY. NOV. 23, 1976.
4,019,816.—COATING SYSTEM HAVING A COMPOSITE APPLICATOR ASSEMBLY PROVIDED WITH A RECIPROCATING BLADE. APR. 26, 1977.

Class 12L

3,622,691.—HIGH SPEED LIGHT RESPONSIVE TRANSFORM COMPUTER FOR A LIGHT-SENSITIVE PRINTING SYSTEM. NOV. 23, 1971. CAN. 0915813, GRB. 1335222, JAP. 0774709.
3,649,515.—PHOTOGRAPHIC MASKING SYSTEM. MAR. 14, 1972. CAN. 0936733, GRB. 1349610, JAP. 0774711.
3,715,209.—ELECTRICAL COLOR MASKING FOR A PHOTOELECTROPHORETIC IMAGING PROCESS. FEB. 6, 1973. BEL. 0763539, CAN. 0938491, FRA. 7107557. GRB. 1347139, ITL. 0918979, JAP. 0752723, MEX. 0120935.
3,810,758.—PHOTOGRAPHIC MASKING SYSTEM. MAY 14, 1974.

Class 12M

RE.27,117.—METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-RE OF 3,357,989-D1170. APR. 20, 1971.
3,384,632.—ARYLAZO-4-ISOPROPOXY-1-NAPHTHOL COMPOUNDS. MAY 21, 1968. BEL. 0743897, CAN. 0787920, FRA. 1473703, GER. 1644400, GRB. 1145374, ITL. 0764015, JAP. 0578398.
3,402,177.—SUBSTITUTED 1-CYANO-2, 3-PHTHALOYL-7, 8-BENZOPYRROCOLINES. SEPT. 17, 1968. AUS. 0435189, BEL. 0743896, CAN. 0812820, GRB. 1145373.
3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.
3,442,781.—PHOTOELECTROPHORETIC AND XEROGRAPHIC IMG. PROC. EMPL. TRIPHENODLOXAZINES AS ELECTRIC. PHOTOSENSIT. MAY 6, 1969. AUS. 0445582, BEL. 0743894, CAN. 0855152, GRB. 0175452, JAP. 0611634.
3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.
3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.
3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.
3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPHTO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.
3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. AUS. 0445639, BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.
3,474,020.—PHOTOELECTROPHORETIC IMAGING PROCESS USING QUINACRIDONES. OCT. 21, 1969. ARG. 0154377, AUS. 0414491, BEL. 0683405, CAN. 0834673, FRA. 0090574, GRB. 1155403, ITL. 0842587, JAP. 0601872, MEX. 0088935, SPN. 0328503, SWD. 6608734, VZL. 0023989.
3,478,064.—1,5-BIS-SUBSTITUTED ALKYLAMINO-ANTHRAQUINONES. NOV. 11, 1969. ARG. 0145636, AUS. 0419687, BEL. 0683222, CAN. 0880309, FRA. 1484968, GRB. 0155985, ITL. 0771955, JAP. 0581828, MEX. 0092775, SPN. 0328428, STZ. 0461273, SWD. 0328188, VZL. 0021224.
3,485,633.—ELECTROPHORETIC IMG PROC EMPL METALLIC LAKES OF FLUORESCEIN DERIVATIVES AS ELECTRICLY PHOTOSENS. DEC. 23, 1969. AUS. 0444394, BEL. 0743641, CAN. 0848386, GER. 1572387, GRB. 1190965, JAP. 0586923.
3,492,308.—PROCESS FOR PREPARING METAL FREE PHTHALOCYANINES - SYNTHESIS OF METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0922708, GRB. 1216887, JAP. 0586926.
3,492,309.—SYNTHESIS OF ALPHA METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0894803, GRB. 1206306, JAP. 0604155.
3,531,309.—COMPOSITIONS COMPRISING 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRROCOLINES AND A CARRIER. SEPT. 29, 1970.
3,546,085.—PHOTOELECTROPHORETIC IMAGING PROCESS AND SUSPENSION. DEC. 8, 1970. BEL. 0710052, CAN. 0875493, FRA. 1568088, GER. 1622380, GRB. 1208812, ITL. 0823929, JAP. 0594741.
3,560,360.—PHOTOELECTROPHORETIC IMAGING PROCESS AND ANTHRAQUINONES AS THE ELECTRICALLY PHOTOSENSITIVE PARTIC. FEB. 2, 1971. CAN. 0850590, MEX. 0096584.
3,562,248.—BISAZO PGMTS DRVD CPLRS OBTD CONDG 8-AMINO-2-NAPHTHOLS W/ DICARBOXYLIC ACID CHLORIDES. FEB. 9, 1971. ATR. 0302037, AUS. 0435392, BEL. 0743422, CAN. 0889836, FRA. 6944290, GER. 1717183, GRB. 1217905, ITL. 0879047, JAP. 0608727.
3,574,182.—CALCIUM SALT OF 6-BROMO-1-1-SULFO-2-NAPHTHYLAZO-2-NAPHTHOL. APR. 6, 1971. ARG. 0168131, ATR. 0302812, AUS. 0429649, BEL. 0710053, CAN. 0878483, CHL. 0024254, CLB. 0018785, DNK. 0128493, FIN. 0049711, FRA. 1556484. GRB. 1197374, GRK. 0036648, IND. 0114221, ISR. 0029376, ITL. 0823989, JAP. 0605213, LXB. 0055364, MEX. 0099564, NOR. 0129593, NZL. 0151403, PRU. 0009483, PTG. 0049036, SAF. 0068559, SPN. 0349965, STZ. 0524844, SWD. 0351737, URG. 0008893, VZL. 0032776.
3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.
3,615,558.—PHOTOLECTROPHORETIC IMAGING PROCESS EMPLOYING A FINELY-DIVIDED PHTHALOCYANINE PIGMENT. OCT. 26, 1971. CAN. 0850022.
3,616,393.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING A PIGMENT HAVING THE FORMULA RNS. OCT. 26, 1971.
3,634,221.—PIGMENT RECLAIMING. JAN. 11, 1972. BEL. 0744760, CAN. 0921427, FRA. 7001822, GRB. 1301382, ITL. 0886625.
3,635,981.—PHOTOELECTROPHORETIC IMAGING PIGMENT COMPOSITION AND PROCESS. JAN. 18, 1972. ARG. 0193337, ATR. 0305459, AUS. 0448778, BEL. 0741064, CAN. 0953143, FRA. 6937772, GER. 1955001, GRB. 1285610, ITL. 0879711, JAP. 0685461, MEX. 0114879.
3,645,883.—PHTELCTRPHRTC IMGNG APRTUS EMPLYNG PHTSNSTV PRTCLS EXHBTG FATIGUE CHARACTERISTICS. FEB. 29, 1972.
3,652,438.—PHTELCTRPHRTC IMGNG PROCS USNG DIVLNT HVY MTL SLT OR 1-1-SULFO-2-NAPHYLZO-2-NAPHLS AS IMGNG MAT. MAR. 28, 1972.
3,658,675.—PHOTOELECTROPHORETIC IMAGING PROCESS USING BISAZO PIGMENTS. APR. 25, 1972.
3,692,517.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING AN INSULATING CARRIER LQD CNTNG UNSATURATED COMP. SEPT. 19, 1972. ARG. 0164485, AUS. 0430397, BEL. 0715670, CAN. 0913968, FRA. 1563583, GER. 1772522, GRB. 1225316, ITL. 0834948, JAP. 0641521, MEX. 0100255, VZL. 0032921.
3,705,901.—PHOTOELECTROPHORETIC IMAGING COMPOSTION. DEC. 12, 1972.
3,753,708.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING QUINACRIDONE PIGMENTS. AUG. 21, 1973.
3,758,305.—PHOTOELECTROPHORETIC IMAGING PROCESS. SEPT. 11, 1973.
3,825,422.—IMAGING PROCESS. JULY 23, 1974. CAN. 0984201, GRB. 1442667.
3,867,141.—PHOTOELCTRC AND ELCTRPHOTGRPHC PGMNTS COMPRISNG DERIVATIVS OF CNDNSD PLYCLC AROMTC HYDROCRBN ALDE. FEB. 18, 1975.
3,922,169.—PHOTOELECTRIC AND ELECTROPHOTOGRAPHIC PIGMENTS COMPRISING DERIVATIVES OF CONDENSED POLYCYCLIC A. NOV. 25, 1975.
3,923,506.—PHOTOELECTRIC AND ELECTROPHOTOGRAPHIC PIGMENTS COMPRISING DERIVATIVES OF CONDENSED POLYCYCLIC A. DEC. 2, 1975.
3,953,462.—IMAGING PROCESS. APR. 27, 1976. ARG. 0202139, BEL. 0821400, GRB. 1467999.
3,957,829.—CERTAIN DINAPHTHO (1,2-B;2',3'-D)-FURAN-7,12 DIONES. MAY 18, 1976.
4,012,252.—IMAGING PROCESS UTILIZING 3-BROMO-N-2"-PYRIDYL-8,13-DIOXODIMAPHTHO-(2,1-; 3',3'-)-FURON-6-CARBO. MAR. 15, 1977. ARG. 0202139, BEL. 0821400, GRB. 1467999.
4,017,311.—PHOTOELECTROPHORETIC IMAGING SUSPENSION. APR. 12, 1977.

4,032,339.—PHOTOSENSITIVE COMPOSITION CONTAINING VANADYL PHTHALOCYANINE FOR PHOTOELECTROPHORECTIC IMAGING. JUNE 28, 1977.

4,062,854.—PROCESS FOR PREPARING N-SUBSTITUTED-8,13-DIOXODINAPHTHO-(2,1-B; 2,3-D)FURAN-6-CARBOXAMIDE. DEC. 13, 1977. CAN. 1023360, FRA. 7423881.

4,076,527.—PHOTOSENSITIVE COMPOSITION USEFUL IN PHOTOELECTROPHORETIC IMAGING. FEB. 28, 1978.

4,104,064.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING DINAPHTHO-FURANDIONE PIGMENTS. AUG. 1, 1978.

Class 12N

3,446,722.—ELECTROPHORETIC REFINING OF PHOTOSENSITIVE PARTICLES. MAY 27, 1969. AUS. 0424699, BEL. 0743903, CAN. 0840368. GER. 1622376, GRB. 1189636.

3,473,940.—PREPARATION OF PHOTOELECTROPHORETIC IMAGING SUSPENSION. OCT. 21, 1969. BEL. 0743899, CAN. 0847808, FRA. 1524448, GER. 1572386, GRB. 1161780, ITL. 0794432, JAP. 0594583, MEX. 0097623.

3,477,934.—IMAGING PROCESS. NOV. 11, 1969. ARG. 0158372, AUS. 0416251, BEL. 0700645, CAN. 0850023, FRA. 1550998, GRB. 1196044, ITL. 0804665, JAP. 0725097, MEX. 0098737, SPN. 0342376, STZ. 0481408, SWD. 0336525, VZL. 0021263.

3,551,313.—IMAGE CONTRAST CONTROL IN PHOTOELECTROPHORETIC IMAGING - PHAROS CONTRAST CONTROL. DEC. 29, 1970. ATR. 0302814, AUS. 0448317, BEL. 0738218, CAN. 0899689, FRA. 6929449, GER. 1944510, GRB. 1274525, ITL. 0871538, JAP. 0708365, SWD. 0341130.

3,553,093.—COLOR PHOTOELECTROPHORETIC IMAGING PROCESS. JAN. 5, 1971. ATR. 0286783, AUS. 0416331, BEL. 0692911, CAN. 0818388, FRA. 1471745, GER. 1522743, GRB. 1149665, IND. 0104183, ISR. 0025304. ITL. 0762674, JAP. 0608337, MEX. 0089790, NOR. 0123368, NZL. 0144531, STZ. 0479099, SWD. 0334540.

3,586,615.—PHOTOELECTROPHORETIC IMAGING PROCESS INCLUDING THE USE OF AN ELECTRICALLY CHRGD SUSPNSN COATNG. JUNE 22, 1971. BEL. 0743921, CAN. 0891972, FRA. 6945567, GER. 1965460, GRB. 1284429, HOL. 1284429, ITL. 0880418, JAP. 0729281.

3,595,770.—SEQUENTIAL PHOTOELECTROPHORETIC IMAGING SYSTEM. JULY 27, 1971. ARG. 0176384, ATR. 0299697, AUS. 0429715, BEL. 0722300, BRA. 0087996, CAN. 0891970, CHL. 0024332, DNK. 0126879, FRA. 1589548, GRB. 1239259, ITL. 0845021, LXB. 0057101, MEX. 0103850, NZL. 0154114, PNM. 0001418, PTG. 0050485, SAF. 0686705, SPN. 0359239, STZ. 0496265, SWD. 0339172, URG. 0009317, VZL. 0023705.

3,601,483.—IMAGING APPARATUS. AUG. 24, 1971.

3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.

3,616,390.—ELECTROPHORETIC IMAGING METHOD CHARACTERIZED BY EXPOSURE OF ELECTRCLY PHOTSNSTV PRTCLS AT LIQUI. OCT. 26, 1971. ATR. 0322980, AUS. 0448380. BEL. 0743423, CAN. 0890356, FRA. 6944288, GER. 1947105, GRB. 1249546, ITL. 0879048, JAP. 0688351.

3,616,395.—PHOTOELECTROPHORETIC IMAGING WITH CORONA FIELD APPLICATION. OCT. 26, 1971. CAN. 0922142, GRB. 1318565, JAP. 0756962.

3,620,950.—ELECTROPHORETIC IMAGING EMPLOYING PERIODIC ELECTROMAGNETIC RADIATION. NOV. 16, 1971. ATR. 0302045, AUS. 0449606, BEL. 0739750, CAN. 0887022, FRA. 5934262, GRB. 1283384, ITL. 0877875, JAP. 0718339.

3,634,221.—PIGMENT RECLAIMING. JAN. 11, 1972. BEL. 0744760, CAN. 0921427, FRA. 7001822, GRB. 1301382, ITL. 0886625.

3,642,598.—PHOTOELECTROPHORETIC IMAGING METHOD AND APPARATUS. FEB. 15, 1972. ARG. 0188632, BEL. 0756481, CAN. 0922144, FRA. 7034709, GRB. 1324105, ITL. 0908073, JAP. 0740359, MEX. 0115601, VZL. 0032786.

3,645,874.—IMAGE DENSITY CONTROL IN PHOTOELECTROPHORETIC IMAGING. FEB. 29, 1972. BEL. 0756899, CAN. 0922957, FRA. 7035803, GRB. 1331621, ITL. 0908434, JAP. 0743836.

3,645,883.—PHTELCTRPHRTC IMGNG APRTUS EMPLYNG PHTSNSTV PRTCLS EXHBTG FATIGUE CHARACTERISTICS. FEB. 29, 1972.

3,647,659.—PHTELCTRPHRTC IMGNG PRCS WHEREIN IMGNG ELCTRCL FLD APPLD SUBSEQUENT TO IMAGE WISE EXPOSURE. MAR. 7, 1972. BEL. 0772912, CAN. 0958581, FRA. 7134730, GRB. 1354798, ITL. 0936734.

3,657,091.—ELECTROPHORETIC IMAGING METHOD EMPLOYING A PERIODIC ELECTRIC FIELD. APR. 18, 1972. ARG. 0174612, ATR. 0302816, AUS. 0448524, BEL. 0739752, CAN. 0913970, FRA. 6933735, GRB. 1282469, ITL. 0889439, JAP. 0709039, MEX. 0114739.

3,663,396.—KINESCOPE PHOTOELECTROPHORETIC IMAGING METHODS AND SYSTEMS. MAY 16, 1972. ARG. 0196858, BEL. 0762417, CAN. 0935965, FRA. 7104350, GRB. 1345571, ITL. 0918121, JAP. 0743838, MEX. 0131834.

3,664,941.—PHTELCTRPHRTC REVERSAL IMGNG USNG SUSPENSION CONTAINING VITAMIN PRECURSOR, B-CAROTENE. MAY 23, 1972.

3,666,472.—ELECTROPHORETIC IMAGING COMPOSITION - IMPROVEMENT OF PHAROS POLYCHROME IMAGING SYSTEM. MAY 30, 1972. ATR. 0302042, AUS. 0455711, BEL. 0739753, CAN. 0899138, FRA. 6933736, GRB. 1279284, HOL. 0147548, ITL. 0889440, JAP. 0709040, MEX. 0116450.

3,669,872.—IMAGING SYSTEM. JUNE 13, 1972.

3,676,313.—REMOVING UNDESIRED POTENTIAL FROM BLOCKING ELECTRODE IN A PHOTOELECTROPHORETIC IMAGING SYSTEM. JULY 11, 1972.

3,681,221.—PHOTOELECTROPHORETIC IMAGING BY PHOSPHORESCENCE. AUG. 1, 1972. CAN. 0935013, GRB. 1348121.

3,696,020.—ELECTROPHORETIC IMGNG APRTS INCLUDING MEANS TO COAT AND ELCTRFY IMGNG ELCTRODE. OCT. 3, 1972.

3,723,288.—ELECTROPHORETIC IMAGING APPARATUS INCLUDING MEANS TO PROJECT AN IMAGE AT A LIQUID NIP. MAR. 27, 1973.

3,737,310.—BACKGROUND REDUCTION. JUNE 5, 1973.

3,741,639.—PHOTOELECTROPHORETIC IMAGING BY PHOSPHORESCENCE. JUNE 26, 1973.

3,741,760.—IMAGING SYSTEM. JUNE 26, 1973.

3,748,035.—METHOD FOR SEQUENTIAL ILLUMINATION IN A POLYCHROME PROCESS. JULY 24, 1973. CAN. 0960288, GRB. 1416328.

3,772,013.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING ELECTRICALLY PHOTOSENSITIVE PARTICLES AND INERT PA. NOV. 13, 1973. ARG. 0196295, ATR. 0327682, BEL. 0777724, CAN. 0957543, FRA. 7200998, GRB. 1370026, ITL. 0946356, JAP. 0759477, MEX. 0124561, SPN. 0398586, SWD. 0367075, VZL. 30687.

3,782,932.—ELECTROPHORETIC IMAGING PROCESS USING TRANSPARENT PARTICLES. JAN. 1, 1974. ATR. 0302043, AUS. 0446066, BEL. 0743424, CAN. 0913441, FRA. 6944289, GER. 1949149, GRB. 1280900, ITL. 0897053. JAP. 0699518.

3,785,816.—ELIMINATING CORONA ARCING IN PHOTOELECTROPHORETIC IMAGING. JAN. 15, 1974.

3,787,206.—PHOTOELECTROPHORETIC IMAGING METHOD INCLUDING AT LEAST ONE ELECTRODE CARRYING A PATTERN. JAN. 22, 1974.

3,801,195.—ELECTROPHORETIC IMAGING. APR. 2, 1974. ARG. 0174613, ATR. 0293874, AUS. 0455712, BEL. 0739747, CAN. 0922141, FRA. 6933738, GER. 1949416, GRB. 1279285, HOL. 0146950, ITL. 0877873, JAP. 0709042, MEX. 0108820.

3,804,620.—METHOD OF PRODUCING PLANOGRAPHIC PLATES BY PHOTOELECTROPHORETIC IMAGING. APR. 16, 1974.

3,811,764.—APPARATUS FOR PHOTOELECTROPHORETIC IMAGING USING A PERIODIC ELECTRIC FIELD. MAY 21, 1974.

3,850,627.—ELECTROPHORETIC IMAGING METHOD. NOV. 26, 1974. BEL. 0777719, FRA. 7201005, GRB. 1376241, ITL. 0946357.

3,857,549.—PHOTOELECTROPHORETIC IMAGING APPARATUS. DEC. 31, 1974.

3,857,707.—PHOTOELECTROPHORETIC IMAGING PROCESS USING DRY PIGMENT COATED SUBSTRATE. DEC. 31, 1974.

3,881,920.—PHOTOELECTROPHORETIC IMAGING PROCESS. MAY 6, 1975.

3,901,701.—PHOTOELECTROPHORETIC IMAGING PROCESS USING PHOTOCONDUCTIVE ELECTRODE WHICH ALTERS SPECTRAL RESPONSE. AUG. 26, 1975.

3,905,812.—IMAGING PROCESS. SEPT. 16, 1975. FRA. 7413994, GRB. 1443121.

3,920,330.—ELECTROPHORETIC IMAGING APPARATUS. NOV. 18, 1975. BEL. 0777719, CAN. 0961334, FRA. 7201005, GRB. 1376241, ITL. 0946357.

3,933,487.—IMAGING COMPOSITION FOR PHOTOELECTROPHORETIC IMAGING SYSTEM. JAN. 20, 1976. CAN. 0973005, GRB. 1375941.
3,954,465.—ELECTROPHORETIC IMAGING METHODS. MAY 4, 1976. BEL. 0777719, FRA. 7201005, GRB. 1376241, ITL. 0946357.
3,961,949.—PHOTOELECTROPHORETIC IMAGING METHOD PRODUCING A DESIRED IMAGE BORDER. JUNE 8, 1976.
3,967,960.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING DARK CHARGE INJECTING ELEMENT. JULY 6, 1976.
4,023,968.—PHOTOELECTROPHORETIC COLOOR IMAGING PROCESS IN WHICH BACK MIGRATION IS ELIMINATED. MAY 17, 1977.
4,069,047.—TRANSFER OF PHOTOELECTROPHORETIC IMAGES. JAN. 17, 1978.
4,078,928.—PHOTOELECTROPHORETIC IMAGING SYSTEM. MAR. 14, 1978.
4,172,721.—DYE-AMPLIFIED IMAGING PROCESS. OCT. 30, 1979. AUS. 494739, BEL. 822400, CAN. 1033041, FRA. 7438506, GER. 7438730, GRB. 1484706. ITL. 1025877, SPN. 432205, SWD. 74144650.

Class 12O

3,647,660.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A HALOGEN CONTAINING SUSPENSION. MAR. 7, 1972.
3,869,286.—PHOTOELECTROPHORETIC IMAGING WITH COPPER-FREE CHLOROPHYLL IN THE CARRIER LIQUID. MAR. 4, 1975.

Class 12P

RE.28,260.—ELECTROPHORETIC IMAGING PROCESS INCLUDING APPL OF DYNAMIC STRESS ON THE PARTICLE SUSPENSION. DEC. 3, 1974. ARG. 0174614, ATR. 0302044, AUS. 0448318, BEL. 0739748, CAN. 0890358, FRA. 6934260, GER. 1949148, GRB. 1282736, HOL. 0146301, ITL. 0877874, JAP. 0718340, MEX. 0108886.
3,595,772.—METHOD OF BREAKING PARTICLE AGGLOMERATES IN THE PHOTO-ELECTROPHORETIC IMAGING SYSTEM. JULY 27, 1971. ARG. 0176808, ATR. 0293875, AUS. 0445175, BEL. 0739749, CAN. 0912398, FRA. 6934261, GRB. 1290370, ITL. 0887503, JAP. 0712831, MEX. 0127747.
3,616,391.—ELECTROPHRTC IMGNG PRCSS INC APPLCTN OF DYNAMIC STRESS ON PARTCL SUSPSN-REISSUED D 2177R. OCT. 26, 1971. ARG. 0174614, ATR. 0302044, AUS. 0448318, BEL. 0739748, CAN. 0890358, FRA. 6934260, GER. 1949148, GRB. 1282736, HOL. 0146301, ITL. 0877874, JAP. 0718340, MEX. 0108886.
3,666,472.—ELECTROPHORETIC IMAGING COMPOSITION - IMPROVEMENT OF PHAROS POLYCHROME IMAGING SYSTEM. MAY 30, 1972. ATR. 0302042, AUS. 0455711, BEL. 0739753, CAN. 0899138, FRA. 6933736, GRB. 1279284, HOL. 0147548, ITL. 0889440, JAP. 0709040, MEX. 0116450.
3,743,404.—PHTOELECTROPHORETIC IMGNG APPTS INCNG MEANS TO SIMULTNUSLY APPLY COMPRSVE STRESS AND SHEAR TO IMGNG. JULY 3, 1973.
3,784,302.—ELECTROPHORETIC IMAGE APPARATUS INCLUDING APPLICATION OF DYNAMIC STRESS ON THE PARTICLE SUSPENS. JAN. 8, 1974.
3,833,493.—IMAGING PROCESS. SEPT. 3, 1974.
3,943,049.—APPARATUS FOR SEPARATING AGGLOMERATED PARTICLES WITH SUSPENSION. MAR. 9, 1976.

Class 12Q

3,642,364.—TRANSFER APPARATUS. FEB. 15, 1972. AUS. 0455718, BEL. 0758808, CAN. 0918412, CZC. 0164906, EGR. 0087486, FRA. 7041650, GRB. 1336720, HUN. 0169308, ITL. 0909310, PLD. 0082862, SPN. 0385456, STZ. 0518581, USR. 0406387.
3,655,370.—PHOTOELECTROPHORETIC IMAGE TRANSFER. APR. 11, 1972.
3,705,797.—FIXING PROCESS FOR PHOTOELECTROPHORETIC IMAGING. DEC. 12, 1972.
3,711,196.—IMAGE TRANSFER. JAN. 16, 1973.
3,791,823.—PHOTOELECTROPHORETIC IMAGING TRANSFER METHOD. FEB. 12, 1974.
3,804,508.—PHOTOELECTROPHORETIC APPARATUS FOR HEAT FACING AN IMAGE. APR. 16, 1974.
3,897,143.—IMAGING SYSTEM. JULY 29, 1975.
4,065,304—METHOD FOR FIXING INK IMAGES. DEC. 27, 1977. BEL. 848487.

Class 12R

3,574,614.—PROCESS OF PREPARING MULTIPLE COPIES FROM A XEROPRINTING MASTER. APR. 13, 1971. ATR. 0305769, AUS. 0448396, BEL. 0743660, CAN. 0882599, FRA. 6944513, GRB. 1209060, ITL. 0899118, JAP. 0710908.
3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.
3,682,628.—PHOTOELECTROPHORETIC FACSIMILE TRANSMISSION. AUG. 8, 1972. CAN. 0957889, GRB. 1365163.
3,800,302.—RECORDING OSCILLOGRAPH UTILIZING PHOTOELECTROPHORETIC TECHNIQUES. MAR. 26, 1974.
3,849,132.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A CHROMOGENIC REACTION. NOV. 19, 1974. BEL. 0809399, GRB. 1447104.
3,938,088.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 10, 1976.

Class 15

3,693,517.—PRINTING APPARATUS—KALEIDOSCOPE PRINTER WITH CIRCUMFERENTIAL STRIPS. SEPT. 26, 1972. CAN. 0948265, GRB. 1330327.
3,801,319.—IMAGING METHOD UTILIZING CHEMICAL REACTIVITIES OF PHOTOEXCITED STATES OF AROMATIC HYDROXY COMPO. APR. 2, 1974. CAN. 1000549, GRB. 1429501.
3,847,644.—IMAGING BY PHASE AGGREGATION FROM BLOCK COPOLYMERS. NOV. 12, 1974.
3,851,584.—CHEMICAL REPRODUCTION SYSTEMS. DEC. 3, 1974.
3,888,670.—IMAGING METHOD. JUNE 10, 1975.
3,915,706.—IMAGING SYSTEM BASED ON PHOTODEGRADABLE POLYALDEHYDES. OCT. 28, 1975.
3,923,514.—METHOD FOR THE PREPARATION OF RELIEF PRINTING MASTERS. DEC. 2, 1975.
3,929,477.—IMAGE PRODUCING TECHNIQUES OF SUPERCONDUCTING MATERIAL IN A MAGNETIC FIELD. DEC. 30, 1975.
3,930,858.—HEAT DEVELOPMENT PROCESS UTILIZING A PHOTOSENSITIVE COMPOSITION CONTAINING A HALOGENATED POLYME. JAN. 6, 1976.
3,963,491.—IMAGING METHOD. JUNE 15, 1976.
3,986,874.—DRIOGRAPHIC IMAGING METHOD. OCT. 19, 1976.
3,990,043.—CHARACTER CODING AND RECOGNITION SYSTEM. NOV. 2, 1976.
4,009,466.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 22, 1977.
4,032,980.—RECORDED MAGNETIC MEMBER VIEWING APPARATUS. JUNE 28, 1977.
4,043,298.—MAGNETIC TONER SCAVENGING SYSTEM. AUG. 23, 1977.
4,064,453.—MAGNETIC FIELD DETECTOR. DEC. 20, 1977.
4,074,276.—MAGNETIC IMAGING SYSTEM USING HEAT. FEB. 14, 1978.
4,076,387.—MAGNETIC DISPLAY. FEB. 28, 1978.
4,089,684.—IMAGING METHOD UTILIZING THE CHEMICAL REACTIVITY OF DONOR-ACCEPTOR MIXTURES. MAY 16, 1978.
4,095,233.—METHOD FOR FORMING A CHARGE PATTERN. JUNE 13, 1978.
4,100,088.—IMAGING COMPOSITION. JULY 11, 1978.
4,101,943.—CONTROLLED-WIDTH-SYNCHRONIZATION OF RECORDED PIXELS. JULY 18, 1978.
4,115,786.—CONSTANT WAVELENGTH MAGNETIC RECORDING. SEPT. 19, 1978.
4,133,683.—AGGLOMERATION IMAGING METHOD. JAN. 9, 1979.
4,135,194.—ROTARY HEAD MAGNETIC RECORDING AT FIXED WAVELENGTH WITH VARYING SPEEDS. JAN. 16, 1979.
4,172,721.—DYE-AMPLIFIED IMAGING PROCESS. OCT. 30, 1979. AUS. 494739, BEL. 822400, CAN 1033041, FRA. 7438506, GER. 7438730, GRB. 1484706, ITL. 1025877, SPN. 432205, SWD. 74144650.
4,175,836.—METHOD AND APPARATUS FOR FORMING VISIBLE IMAGES. NOV. 27, 1979. GRB. 1558014.

Class 15A

3,320,060.—DEFORMATION IMAGE REPRODUCTION PROCESS UTILIZING A VOLTAGE THRESHOLD REDUCING SURFACTANT. MAY 16, 1967. CAN. 0807325, FRA. 1416119, GER. 1261867, GRB. 1097919, ITL. 0739830, JAP. 0519668.

3,338,710.—FROST THERMOGRAPHY. AUG. 29, 1967.

3,404,001.—THERMOPLASTIC DEFORMATION IMAGING WITH COLOR REAGENTS. OCT. 1, 1968. CAN. 0801265, FRA. 1459100, GER. 1497214, GRB. 1124925, ITL. 0725974, JAP. 0529727.

3,615,387.—STRIPPABLE LAYER RELIEF IMAGING PROCESS. OCT. 26, 1971. CAN. 0887033.

3,697,184.—APPARATUS FOR EVALUTING THE RECORDING CHARACTERISTICS OF A THERMOPLASTIC PHOTORECEPTOR. OCT. 10, 1972. CAN. 1083484, GRB. 1389471.

3,715,207.—ELCTRSTCLY DEFORMABLE THERMOPLASTIC LAYER CONTAINING A 1,4-DIALKYLAMINO-9, 10-ANTHRAQUINONE DYE. FEB. 6, 1973.

3,729,310.—SURFACE DEFORMABLE IMAGING PROCESS AND MEMBER. APR. 24, 1973.

3,741,759.—FROST IMAGING PROCESS. JUNE 26, 1973.

3,795,514.—DEFORMATION IMAGING METHOD. MAR. 5, 1974.

3,869,612.—COPY APPARATUS WITH MEANS TO EFFECT VISIBLE RAY IMAGING AND INFRARED RAY TRANSFIXING. MAR. 4, 1975. STZ. 0032775.

3,893,416.—DEVELOPMENT AND CLEANING APP FOR REVERSE PATH MACHINE. JULY 8, 1975.

3,902,062.—REVERSE PATH IMAGING AND TRANSFIXING COPYING METHOD. AUG. 26, 1975. BEL. 0823656.

3,904,875.—SINGLE RADIATION RAY PATH FOR THERMOGRAPHIC IMAGING & TRANSFIXING OR FUSING. SEPT. 9, 1975. ARG. 0207128.

3,906,896.—INK APPLICATOR. SEPT. 23, 1975. CAN. 0974753.

3,908,125.—REVERSE PATH IMAGING AND TRANSFIXING COPYING MACHINE. SEPT. 23, 1975.

3,909,613.—COPYING METHOD AND APP WITH MEANS TO EFFECT VISIBLE RAY IMAGING AND INFRARED RAY TRANSFIXING OR FUS. SEPT. 30, 1975.

3,923,004.—DEVELOPMENT AND CLEANING APPARATUS FOR REVERSE PATH MACHINE. DEC. 2, 1975. BEL. 0823656.

3,932,025.—IMAGING SYSTEM. JAN. 13, 1976.

3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.

3,946,230.—COPY METHOD UTILIZING SINGLE RADIANT RAY PATH FOR IMAGING AND TRANSFIXING. MAR. 23, 1976.

3,949,160.—ELECTRO-OPTIC READ OUT OF THERMOPLASTIC DEFORMATION PATTERNS. APR. 6, 1976.

3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.

3,984,262.—METHOD OF MAKING A SUBSTRATE STRIPED PLANAR LASER. OCT. 5, 1976.

3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.

4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

4,051,463.—METHOD AND APPARATUS FOR INVERTING THE POLARITY OF AN INPUT IMAGE FORMED ON A SURFACE OF AN. SEPT. 27, 1977. FRA. 7701769.

4,063,222.—SELECTIVE ERASURE OF IMAGE RECORDING DEVICES. DEC. 13, 1977. FRA. 7701592.

4,099,262.—AUTOMATIC MEMORY CONTROL FEEDBACK SYSTEM FOR A CYCLING OPTICAL IMAGING SYSTEM. JULY 4, 1978.

4,109,316.—METHOD AND APPARATUS FOR INVERTING THE POLARITY OF AN INPUT IMAGE FORMED ON A SURFACE OF AN. AUG. 22, 1978.

4,133,611.—TWO-PAGE INTERWEAVED RANDOM ACCESS MEMORY CONFIGURATION. JAN. 9, 1979.

Class 15B

3,350,205.—METHOD OF IMAGE REPRODUCTION BY PHOTOPOLYMERIZATION AND BLUSHING. OCT. 31, 1967. CAN. 0717934, GRB. 1095174, JAP. 0561238.

3,561,962.—METHOD OF IMAGE REPRODUCTION BY PHOTOPOLYMERIZATION AND BLUSHING. FEB. 9, 1971.

3,834,906.—LIGHT ACTIVATING IMAGING PROCESS. SEPT. 10, 1974.

3,885,963.—LIGHT ACTIVATING IMAGING PROCESS. MAY 27, 1975.

3,890,147.—LIGHT ACTIVATING IMAGING PROCESS. JUNE 17, 1975.

3,892,180.—LIGHT ACTIVATING IMAGING PROCESS. JULY 1, 1975.

3,892,570.—LIGHT ACTIVATING IMAGING PROCESS. JULY 1, 1975.

Class 15B 2

3,862,841.—POLYMERIZATION IMAGING BY CHARGE INJECTION FROM A PHOTOCONDUCTIVE LAYER. JAN. 28, 1975.

Class 15C

3,250,636.—MTD AND APTS IMAGE REPRODCTN W/ USE OF REUSABLE HEAT DEMAGNETIZABLE FERROMAGNETIC IMAGING LAYER. MAY 10, 1966. CAN. 0711404, GRB. 1070986, JAP. 0487336.

3,526,191.—DUPLICATING PROCESS EMPLOYING MAGNETIC DEVELOPER MATERIAL. SEPT. 1, 1970. CAN. 0903830, GER. 1671576, GRB. 1208307.

4,014,065.—MAGNETIC DEVELOPER REMOVAL SYSTEM. MAR. 29, 1977.

4,030,104.—THERMO-MAGNETIC IMAGE TRANSFER APPARATUS. JUNE 14, 1977.

4,032,923.—THERMOMAGNETIC IMAGING APPARATUS. JUNE 28, 1977.

4,035,810.—MAGNETIC INTERPOSITIVE METHOD WITH ELECTROSTATIC IMAGING. JULY 12, 1977.

4,038,665.—DONOR TRANSFER OF MAGNETIC TONER. JULY 26, 1977.

4,060,811.—MAGNETIC LATENT IMAGE CREATION. NOV. 29, 1977.

4,067,018.—EXCESSIVE MAGNETIC DEVELOPER DISPLACEMENT SYSTEM. JAN. 3, 1978.

4,092,954.—HIGH SPEED TANK DEVELOPMENT SYSTEM. JUNE 6, 1978.

4,096,485.—SUCCESSIVE DEVELOPMENT MAGNETIC IMAGING APPARATUS. JUNE 20, 1978.

4,101,320.—MAGNETIC IMAGING METHOD. JULY 18, 1978.

4,101,904.—MAGNETOGRAPHIC IMAGING MEMBER AND THE METHOD OF ITS USE. JULY 18, 1978.

4,101,943.—CONTROLLED-WIDTH-SYNCHRONIZATION OF RECORDED PIXELS. JULY 18, 1978.

4,108,111.—DEVELOPER HOUSING. AUG. 22, 1978.

4,108,112.—DEVELOPER HOUSING. AUG. 22, 1978.

4,112,156.—MAGNETIC TONER RECOVERY METHOD USING ALTERNATING MAGNETIC FIELD POLARITIES. SEPT. 5, 1978. GRB. 1530562.

4,115,786.—CONSTANT WAVELENGTH MAGNETIC RECORDING. SEPT. 19, 1978.

4,121,261.—SYNCHRONOUS HELICAL SCAN-HELICAL RECORD MAGNETIC IMAGING. OCT. 17, 1978.

4,135,194.—ROTARY HEAD MAGNETIC RECORDING AT FIXED WAVELENGTH WITH VARYING SPEEDS. JAN. 16, 1979.

4,138,685.—RECORDING WITH IMAGEWISE ALTERATION OF MAGNETIC ATTRACTION OF DONOR. FEB. 6. 1979.

4,181,426.—RANDOM-DUMP STORAGE BUFFER FOR MOVING WEB. JAN. 1, 1980. GRB. 1554696.

4,199,766.—RANDOM-DUMP STORAGE BUFFER FOR MOVING WEB. APR. 22, 1980. GRB. 1554696.

Class 15D

3,441,410.—DEFORMATION IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. APR. 29, 1969. CAN. 0801267, FRA. 1485348, GER. 1522696, GRB. 1156151, JAP. 0545759.

3,441,411.—IMAGE FORMATION THROUGH CHEMICAL REACTION OF PHOTOCHROMIC MATER. APR. 29, 1969. CAN. 0834676, GRB. 1165215.

3,442,646.—FRMATION OF LIGHT SCATTERING IMGS IN LAYERS COMPRSNG ORGANIC PHOTOCHROMIC MATERIALS. MAY 6, 1969. GRB. 1164484.

3,450,530.—PHOTOGRAPHIC IMAGING BY MEANS THE SURFACE TENSION CREATED BY PHOTOCHROMIC MATERIALS. JUNE 17, 1969.

3,450,531.—ADHESIVE IMAGING ON PHOTOCHROMIC LAYERS. JUNE 17, 1969.

3,450,533.—FORMATION OF LIGHT SCATTERING IMAGES IN PHOTOCHROMIC LAYERS. JUNE 17, 1969. CAN. 0875500.

3,451,811.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. JUNE 24, 1969. CAN. 0828692, JAP. 0573734.

3,471,290.—PHOTOCHROMIC PHOTORESIST IMAGING. OCT. 7, 1969.

3,482,973.—IMAGING SYSTEM. DEC. 9, 1969.

3,967,964.—PHOTOSENSITIVE FILM COPRINSING AN ORGANOSELENIUM AND AN ORGANSMERCURY. JULY 6, 1976.
3,973,966.—PHOTOCHROMIC COMPOSITION CONTAINING A DIPHENYL DIBENZOCHRON-3-ENE. AUG. 10, 1976.
4,007,372.—IMPROVED METHOD & ARTICLE FOR IMAGE REPRODUCTION. FEB. 8, 1977.
4,050,937.—IMAGEWISE EXPOSING AND HEATING A MICROIMAGING FILM CONTAINING AN ORGANO DISELENIDE, A TERTI. SEPT. 27, 1977.
4,050,939.—MICROIMAGING FILM CONTAINING AN ORGANO DISELENDIE, A TERTIARY PHOSPHINE OR PHOSPHITE AND AN. SEPT. 27, 1977.
4,106,936.—MICROIMAGING FILM CONTAINING AN ORGANIC DISELENIDE, A TERTIARY PHOSPHINE OR PHOSPHITE & IN. AUG. 15, 1978.

Class 15D 3

4,133,611.—TWO-PAGE INTERWEAVED RANDOM ACCESS MEMORY CONFIGURATION. JAN. 9, 1979.

Class 15E

3,635,708.—VESICULAR IMAGING PROCESS. JAN. 18, 1972.
3,847,644.—IMAGING BY PHASE AGGREGATION FROM BLOCK COPOLYMERS. NOV. 12, 1974.

Class 15F

3,396,401.—APPARATUS AND METHOD FOR MARKING OF INTELLIGENCE ON A RECORD MEDIUM. AUG. 6, 1968.
3,671,237.—METHOD FOR PRODUCING IMAGES. JUNE 20, 1972. CAN. 0886492, GRB. 1317043.
3,753,705.—AGGLOMERATION IMAGING PROCESS USING HARDENABLE MATERIAL. AUG. 21, 1973. CAN. 0929350, GRB. 1330518.
4,029,502.—IMAGING SYSTEM CONTAINING AGGLOMERABLE MATERIAL. JUNE 14, 1977. ARG. 0172317, BEL. 0737813, CAN. 0884217, FRA. 6928725, GER. 1942380, GRB. 1286501, ITL. 0870234, SWD. 0340954.
4,082,549.—AGGLOMERATION IMAGING PROCESS. APR. 4, 1978.
4,084,966.—IMAGING SYSTEM USING AGGLOMERABLE MIGRATION MARKING MATERIAL. APR. 18, 1978.
4,133,683.—AGGLOMERATION IMAGING METHOD. JAN. 9, 1979.

Class 17

4,190,358.—APPARATUS FOR POSITIONING AN ORIGINAL IN REPRODUCING MACHINE. FEB. 26, 1980.

Class 17A

3,909,609.—LIGHT SOURCE MEASURING APPARATUS. SEPT. 30, 1975.

Class 17A 1

3,445,660.—METHOD FOR DETECTION OF ULTRAVIOLET RADIATION. MAY 20, 1969.

Class 17A 2

3,330,700.—SOLAR-CELL PANELS. JULY 11, 1967.
3,359,137.—SOLAR CELL CONFIGURATION. DEC. 19, 1967.
3,513,040.—RADIATION RESISTANT SOLAR CELL. MAY 19, 1970.

Class 17A 3

3,351,493.—DIFFUSED RADIATION TRACKING TRANSDUCER HAVING A LATERAL PHOTO VOLTAGE JUNCTION. NOV. 7, 1967.
3,443,102.—SEMICONDUCTOR PHOTOCELL DETECTOR WITH VARIABLE SPECTRAL RESPONSE. MAY 6, 1969.

Class 17A 4

3,901,607.—HIGH APERTURE REFLECTION PHOTODETECTOR APPARATUS. AUG. 26, 1975.
4,085,321.—MULTIPHASE PHOTOACTIVATED SWITCH. APR. 18, 1978.

Class 17B

3,650,604.—INTER-FERAMETRIC SCANNING APPARATUS AND METHOD. MAR. 21, 1972. CAN. 0954354, GRB. 1363263.
3,650,605.—INTERFERAMETRIC APPARATUS WITH CONTROLLED SCANNING MEANS. MAR. 21, 1972. CAN. 0952749.
3,902,061.—DIGITAL OPTICAL COMPUTER TECHNIQUES. AUG. 26, 1975.
3,978,342.—DUAL MODE RADIATION TRANSMITTING APPARATUS. AUG. 31, 1976.
3,987,685.—CURSOR POSITION DEVICE. OCT. 26, 1976.
4,162,118.—WAVEGUIDE IMAGING SYSTEM. JULY 24, 1979.

Class 17B 1

3,476,473.—FONT INDICATOR. NOV. 4, 1969.
3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.
3,501,838.—PANTOGRAPHIC IMPLEMENTED OVERHEAD PROJECTOR. MAR. 24, 1970.
3,670,633.—RECORDING APPARATUS. JUNE 20, 1972.
3,677,148.—OPTICAL RECORDER. JULY 18, 1972.
3,678,820.—OPTICAL SYSTEM FOR PROJECTION RECORDING APPARATUS. JULY 25, 1972.
3,685,406.—OPTICAL RECORDER. AUG. 22, 1972. BEL. 0777014, CAN. 0960743, FRA. 7146254, GRB. 1372379, ITL. 0944111.
3,695,161.—ALPHANUMERIC PROJECTION DISC ASSEMBLY. OCT. 3, 1972.
3,700,325.—OPTICAL SYSTEM FOR PHOTOCOPYING APPARATUS. OCT. 24, 1972. BEL. 0764830, CAN. 0931409, FRA. 7111622, GRB. 1337447, ITL. 0922162.
3,705,543.—OPTICAL RECORDER. DEC. 12, 1972. CAN. 0948266, GRB. 1372378.
3,759,149.—MULTIPLE FLASH LAMP ALPHANUMERIC PROJECTION DISC ASSEMBLY. SEPT. 18, 1973. CAN. 1002363.
3,759,612.—OPTICAL SYSTEM. SEPT. 18, 1973. BEL. 0792669, CAN. 0972193, FRA. 7243897, GRB. 1395580, ITL. 0984616, SWD. 7216146.
3,768,384.—PROJECTION ASSEMBLY. OCT. 30, 1973.
3,873,207.—POLARIZING INTERFEROMETER. MAR. 25, 1975.
3,880,497.—METHOD OF STORING OPTICAL INFORMATION ON A RANDOM CARRIER. APR. 29, 1975. CAN. 1004887, FRA. 7408054.
3,883,244.—APERTURE ADJUSTMENT IN OPTICAL ASSEMBLY. MAY 13, 1975.
3,897,136.—POLARIZATION-GRATING MOIRE. JULY 29, 1975.
3,909,103.—LENS SCAN MECHANISM. SEPT. 30, 1975.
4,035,068.—SPECKLE MINIMIZATION IN PROJECTION DISPLAYS BY REDUCING SPATIAL COHERENCE OF IMAGE LIGHT. JULY 12, 1977.
4,082,450.—COMPACT ILLUMINATION SYSTEM FOR OPTICALLY PROVIDING A STRUCTURED PHOTORECEPTOR CHARGE DIST. APR. 4, 1978.
4,082,451.—COMPACT ILLUMINATION SYSTEM FOR OPTICALLY PROVIDING A STRUCTURED PHOTORECEPTOR CHARGE DISTR. APR. 4, 1978.
4,110,023.—OPTICAL SYSTEM FOR ALTERNATIVELY PROJECTING ADJACENT IMAGES OF ADJACENT OBJECTS OR DOUBLE. AUG. 29, 1978.
4,113,370.—OPTICAL SYSTEM FOR ALTERNATIVELY PROJECTING ADJACENT IMAGES OF ADJACENT OBJECTS OR DOUBLE. SEPT. 12, 1978.
4,143,943.—REAR PROJECTION SCREEN SYSTEM. MAR. 13, 1979.
4,162,118.—WAVEGUIDE IMAGING SYSTEM. JULY 24, 1979.

Class 17B 2

3,355,308.—PROJECTION TRANSPARENCY HAVING A TRANSPARENT POWDER IMGE. NOV. 28, 1967.
3,476,478.—APPARATUS FOR CHANGING MAGNIFICATION OF PHOTOCOPIER W/O CHANGING CONJUGATE LENGTH OF OPTICAL SY. NOV. 4, 1969. ARG. 0172460, AUS. 0415808, BEL. 0708650, BRA. 6795668, CAN. 0845405, FRA. 1552364, GER. 1297981, GRB. 1223427. ITL. 0821929, MEX. 0100019, VZL. 0023689.
3,508,812.—HIGHLY CORRECTED SIX ELEMENT GAUSS TYPE LENS. APR. 28, 1970.
3,510,219.—OPTICAL ALIGNMENT SYSTEM. MAY 5, 1970. ARG. 0172455, BRA. 6793791, CAN. 0881018, CHL. 0023570, GRB. 1206966, MEX. 0101166, PRU. 0009329, SPN. 0360896, STZ. 0501233, SWD. 0359168, URG. 0008831, VZL. 0025783.

3,591,256.—VARIABLE MAGNIFICATION LENS SYSTEM. JULY 6, 1971. BEL. 0731553, CAN. 0881019, FRA. 6911559, GRB. 1234515, ITL. 0857660, JAP. 0857539.
3,592,531.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JULY 13, 1971. CAN. 0929389.
3,600,066.—OPTICAL ASSEMBLY WITH SUPPLEMENTAL LENS MEANS. AUG. 17, 1971. CAN. 0943792, GRB. 1261159, JAP. 0728824.
3,612,662.—EYEPIECE HAVING A WIDE FIELD OF VIEW AND A LARGE EYE RELIEF. OCT. 12, 1971.
3,620,603.—OFF-CENTER FOCUSING SYSTEM. NOV. 16, 1971.
3,630,599.—MECHANICALLY COMPENSATED ZOOM LENS SYSTEM. DEC. 28, 1971. CAN. 0960891, GRB. 1363113.
3,640,605.—MECHANICALLY COMPENSATED ZOOM LENS SYSTEM. FEB. 8, 1972.
3,659,922.—SYMMETRICAL HALF-LENS OPTICAL SYSTEM. MAY 2, 1972.
3,672,748.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JUNE 27, 1972. ATR. 0322874, AUS. 0467299, BEL. 0783478, CAN. 0960495, GRB. 1358349, ITL. 0955474, SPN. 0402705, STZ. 0544315, SWD. 7206274.
3,741,621.—ADD LENS PROJECTION SYSTEM WITH BALANCED PERFORMANCE. JUNE 26, 1973. BEL. 0781514, CAN. 0963300, FRA. 7208375, GRB. 1393151, ITL. 0950848.
3,817,599.—PROJECTION LENS WITH ADD LENS ELEMENTS. JUNE 18, 1974. CAN. 1008710.
3,865,470.—VARIABLE MAGNIFICATION LENS SYSTEM. FEB. 11, 1975. BEL. 0819497, FRA. 7429827, SPN. 0429431.
3,865,471.—LENS SYSTEM FOR PHOTOELECTROPHORETIC COPYING MACHINE. FEB. 11, 1975.
3,880,498.—ZOOM LENS ASSEMBLY. APR. 29, 1975.
3,907,401.—HIGH PERFORMANCE OPTICAL OBJECTIVE. SEPT. 23, 1975.
3,975,289.—CHARGE TRANSFER COMPLEXEX OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.

Class 17B 3

3,393,956.—UNIFORM-FIELD KERR CELL. JULY 23, 1968.
3,408,133.—KERR-CELL CAMERA SHUTTER. OCT. 29, 1968.

Class 17B 4

3,358,081.—FACSIMILE PRINTER WITH FERROELECTRIC MODULATOR. DEC. 12, 1967. CAN. 0898336, GRB. 1128973.
3,360,323.—TRANSVERSE MAGNETO-OPTICAL ROTATOR WITH COMPENSATION OF PHASE BETA RDATION. DEC. 26, 1967.
3,601,468.—OPTICAL LIGHT WAVE MODULATOR FOR REPRESENTING A FIRST COLOR LIGHT WAVE AS SECOND COLOR LIGHT WA. AUG. 24, 1971.
3,938,881.—ACOUSTO-OPTIC MODULATION DEVICE. FEB. 17, 1976.
4,011,009.—REFLECTION DIFFRACTION GRATING HAVING A CONTROLLABLE BLAZE ANGLE. MAR. 8, 1977.
4,050,027.—OPTICAL SIGNAL AMPLIFIER. SEPT. 20, 1977.
4,077,700.—WAVEGUIDE ADDRESSING AND MODULATING METHOD AND APPARATUS. MAR. 7, 1978.
4,106,848.—ELASTOMER WAVE GUIDE OPTICAL MODULATORS. AUG. 15, 1978. GRB. 1531900.
4,128,299.—WAVEGUIDE OPTICAL MODULATOR. DEC. 5, 1978.
4,170,028.—FACET TRACKING IN LASER SCANNING. OCT. 2, 1979. BEL. 865751.
4,196,977.—ELECTRO-OPTIC MODULATOR DEFLECTOR. APR. 8, 1980. GRB. 1557484.

Class 17C

3,870,921.—IMAGE INTENSIFIER TUBE WITH IMPROVED PHOTOEMITTER SURFACE. MAR. 11, 1975.
4,074,143.—OPTOELECTRONIC DEVICE WITH OPTICAL FEEDBACK. FEB. 14, 1978. FRA. 7631992.
4,138,190.—GEOMETRICAL TRANSFORMATIONS IN OPTICS. FEB. 6, 1979. GRB. 1502127.

Class 17C 1

3,277,297.—ION IMAGE TO ELECTRON IMAGE CONVERTER. OCT. 4, 1966.
3,322,999.—IMAGE-INTENSIFIER TUBE. MAY 30, 1967.
3,519,870.—SPIRLD STRIP MATRL HAVNG PRLEL GROVS FRMNG PLURALITY OF ELCTRN MULTIPLIER CHANNELS. JULY 7, 1970.
3,983,045.—THREE COMPONENT DEVELOPER COMPOSITION. ARG. 0194232, ATR. 0334199, AUS. 0462045, BEL. 0789987, CHL. 0027625, FRA. 7236617, GRB. 1402009, ITL. 0968815, MEX. 0125231, NZL. 0168638, PNM. 0002796, SAF. 0727225, SPN. 0407564, STZ. 0028096, SWD. 7213035, TIW. 0007666, VZL. 0012802.

Class 17C 2

3,368,077.—INFRA-RED IMAGE INTENSIFIER HAVING A TUNNEL-EMISSION CATHODE HAVING A CONDUCTIVE MOSAIC. FEB. 6, 1968.
3,949,225.—INFRARED IMAGING APPARATUS. APR. 6, 1976.

Class 17C 3

3,446,561.—PASSIVE BRIGHT PATTERN RETICLE. MAY 27, 1969.
3,837,732.—PARTIALLY TRANSPARENT PLATED FOR INCREASED IMAGE CONTRAST. SEPT. 24, 1974. CAN. 0893234, GRB. 1237697, JAP. 0645592.

Class 17C 4

3,441,736.—IMAGE INTENSIFIER INCLUDING SEMICONDUCTOR AMPLIFIER LAYER. APR. 29, 1969.

Class 17D

D.235,655.—DISPLAY DEVICE. JULY 1, 1975.
3,987,413—DETECTION SYSTEM. OCT. 19, 1976.
4,035,061.—HONEYCOMB DISPLAY DEVICES. JULY 12, 1977.
4,111,538.—PROJECTION SYSTEM OF HIGH EFFICIENCY. SEPT. 5, 1978.
4,126,528.—ELECTROPHORETIC COMPOSITION AND DISPLAY DEVICE. NOV. 21, 1978.
4,126,854.—TWISTING BALL PANEL DISPLAY. NOV. 21, 1978.
4,143,103.—METHOD OF MAKING A TWISTING BALL PANEL DISPLAY. MAR. 6, 1979.
4,182,553.—HONEYCOMB DISPLAY DEVICES. JAN. 8, 1980.
4,185,256.—MODE CONTROL OF HETEROJUNCTION INJECTION LASERS AND METHOD OF FABRICATION. JAN. 22, 1980.

Class 17D 1

3,422,737.—VARIABLE FONT CHARACTER GENERATOR. JAN. 21, 1969. ARG. 0157019, BRA. 0087922, CAN. 0788611, CHL. 0022222, FRA. 1506176, GRB. 1162840, ITL. 0788951, JAP. 0590133, MEX. 0094427.
3,519,867.—ELECTRIC DISCHARGE TUBE FOR DISPLAYING ALPHNUMERIC CHARACTER SYMBOLS. JULY 7, 1970.
3,564,319.—CATHOD RAY TUBE W/MATRIX FRMG ELEMNTL ELECTRN BEAMS AND MEANS SELECTVLY FRMG INTO CHAR AT FACE PLA. FEB. 16, 1971.
3,587,083.—CHARACTER GENERATION AND DISPLAY SYSTEM. JUNE 22, 1971. CAN. 0858092, FRA. 1582728, GER. 1774884, GRB. 1234580, ITL. 0846528, JAP. 0678504.
3,641,557.—CIRCUIT ARRANGEMENT FOR AN ELECTRIC DISCHARGE TUBE. FEB. 8, 1972.
3,742,484.—CHARACTER GENERATING APPARATUS EMPLOYING BIT STEAM LENGTH CORRECTION. JUNE 26, 1973.
3,781,848.—DISPLAY SYSTEM - CHARACTER GENERATOR SYSTEM A. DEC. 25, 1973.
3,810,165.—ELECTRONIC DISPLAY DEVICE. MAY 7, 1974.
3,830,646.—IMAGE REGISTRATION CORRECTION FOR NON-IMPACT PRINTERS. AUG. 20, 1974. CAN. 0986764, FRA. 7339099, GRB. 1440507.
3,911,419.—CONTROLLER FOR CURSOR POSITIONING ON A DISPLAY MEDIUM. OCT. 7, 1975.
3,952,296.—VIDEO SIGNAL GENERATING APPARATUS WITH SEPARATES PROCESSING OF ODD AND EVEN VIDEO BITS. APR. 20, 1976.
4,103,331.—DATA PROCESSING DISPLAY SYSTEM. JULY 25, 1978.

Class 17D 2

RE.28,360.—ELECTROPHORETIC COLOR DISPLAY DEVICE. MAR. 4, 1975.
3,524,022.—ELECTRO-OPTICAL DISPLAY SYSTEM. AUG. 11, 1970.
3,588,584.—APPARATUS FOR POSITIONING A LIGHT SPOT ONTO A CHARACTER MASK. JUNE 28, 1971.
3,612,758.—COLOR DISPLAY DEVICE - REISSUED D 2717R. OCT. 12, 1971.

Class 17D 3

3,198,976.—ELECTRIC DISCHARGE TUBES AND APPLICATIONS THEREOF. AUG. 3, 1965.
3,264,638.—ELECTRONIC CODE TRANSLATION. AUG. 2, 1966. CAN. 0740559.
3,349,677.—ALPHA NUMERIC CHARACTER PRINTER. OCT. 31, 1967.
3,403,390.—MESSAGE STORAGE. SEPT. 24, 1968. GRB. 1078401.
3,861,804.—INFEROMETRY READOUT OF PHASE INFORMATION. JAN. 21, 1975. CAN. 0980745, GRB. 1387905.
3,898,377.—VIDEO MIXER. AUG. 5, 1975.

Class 17D 4

3,478,659.—APPARATUS FOR JUSTIFYING A REPRODUCED LINE OF CHARACTERS. NOV. 18, 1969.

Class 17D 5

3,330,190.—PRINTING APPARATUS. JULY 11, 1967. CAN. 0758791, GER. 1280282, GRB. 1102419, JAP. 0529726.

Class 17E

3,852,775.—MOVING BELT SCANNING PRINTER. DEC. 3, 1974.
4,027,961.—COPIER/PASTER SCAN APPARATUS. JUNE 7, 1977.
4,080,633.—TWISTING GEOMETRY SCANNER. MAR. 21, 1978.
4,135,812.—MAGNIFICATION CHANGE MECHANISM. JAN. 23, 1979.
4,155,620.—ROTATING MIRROR OPTICAL SCANNER WITH FLAT SCAN AND LINEAR SCAN RATE. MAY 22, 1979.
4,160,939.—MOTOR SPEED CONTROL SYSTEM. JULY 10, 1979.
4,174,174.—COMPOSING REDUCING CAMERA. NOV. 13, 1979.
4,178,064.—REAL TIME GRATING CLOCK FOR GALVANOMETER SCANNERS IN LASER SCANNING SYSTEMS. DEC. 11, 1979.
4,204,233.—ELECTRONIC FACET ERROR CORRECTION FOR LASER SCANNING. MAY 20, 1980.

Class 17E 1

3,337,718.—LIGHT SCAN RECORDING AND READOUT. AUG. 22, 1967. CAN. 0794443, GRB. 1070030.
3,426,144.—TRANSCEIVER APPARATUS FOR TRANSMITTING AND RECORDING OPTICAL INFORMATION. FEB. 4, 1969. CAN. 0810757, GRB. 1158568, JAP. 0579399.
3,426,354.—ELECTROSTATIC CHARGE IMAGE RECORDER. FEB. 4, 1969. AUS. 0295167, BEL. 0664729, CAN. 0739120, DNK. 0115269, FRA. 1455131, GER. 1280281, GRB. 1084494, HOL. 0136720, ITL. 0761085, JAP. 0492014, STZ. 0444906, SWD. 0338117.
3,548,195.—RADIATION SENSITIVE DOCUMENT SCANNING MEANS. DEC. 15, 1970. CAN. 0901968, FRA. 1592840, GER. 1809854, GRB. 1230836, ITL. 0848026, JAP. 0587941.
3,553,463.—RADIATION SENSITIVE DOCUMENT SCANNING APPARATUS USING HELICAL SCANNER. JAN. 5, 1971.
3,775,559.—APERTURE DESIGNS FOR FACSIMILE SCANNING APPARATUS. NOV. 27, 1973. CAN. 0960770, GRB. 1376189.
3,820,900.—INSTRUMENT FOR SCANNING DOCUMENT FOR QUALITY. JUNE 28, 1974.
3,867,571.—FLYING SPOT SCANNER. FEB. 18, 1975. CAN. 0995351.
3,898,470.—SCANNING ARRANGEMENT FOR MULTIFUNCTION OPERATION. AUG. 5, 1975.
3,922,485.—FLYING SPOT SCANNER WITH SCAN DETECTION. NOV. 25, 1975.
3,944,323.—VARIABLE SPOT SIZE SCANNING. MAR. 16, 1976. BEL. 0835552.
3,946,150.—OPTICAL SCANNER. MAR. 23, 1976.
3,962,538.—FLYING SPOT SCANNING SYSTEM WITH VIRTUAL SCANNERS. JUNE 8, 1976.
3,966,319.—FLAT FIELD SCREENING MIRROR. JUNE 29, 1976.
3,970,359.—FLYING SPOT FLAT FIELD SCANNER. JULY 20, 1976.
3,973,825.—FLAT FIELD SCANNING SYSTEM. AUG. 10, 1976. BEL. 0836735.
3,974,506.—SCANNING SYSTEM FOR IMAGING CHARACTERS COMBINED WITH GRAPHIC CURVES. AUG. 10, 1976.
3,997,721.—FLYING SPOT SCANNING SYSTEM WITH REDUCED SCAN ANGLE. DEC. 14, 1976.
4,006,299.—FLAT FILLED SCANNING SYSTEM. FEB. 1, 1977. BEL. 0836543.
4,012,585.—INPUT AND OUTPUT FLYING SPOT SCANNING SYSTEM. MAR. 15, 1977.
4,015,081.—MULTIFUNCTION SCANNING SYSTEM. MAR. 29, 1977. BEL. 0836790.
4,021,897.—A PROCESS FOR PROVIDING CEMENTED GLASS FLATS TO PROVIDE HIGH SPEED MULTIFACETED POLYGONAL SCAN. APR. 10, 1977.
4,034,408.—FLYING SPOT SCANNER. JULY 5, 1977. GRB. 1452300.
4,047,793.—POLYGON SCANNER WITH ANNULAR LIP. SEPT. 13, 1977.
4,052,715.—DIGITAL HALF-TONE GREY SCALE EXPANSION SYSTEM. OCT. 4, 1977.
4,067,639.—HOLOGRAPHIC SCANNING SPINNER. JAN. 10, 1978.
4,070,089.—TWO DIMENSIONAL LASER SCANNER WITH MOVABLE CYLINDER LENS. JAN. 24, 1978.
4,071,754.—BEAM ALIGNMENT DETECTOR. JAN. 31, 1978.
4,080,633.—TWISTING GEOMETRY SCANNER. MAR. 21, 1978.
4,092,632.—CROSSOVER ARRANGEMENT FOR MULTIPLE SCANNING ARRAYS. MAY 30, 1978.
4,093,350.—A SYSTEM FOR CENTRIFUGALLY CASTING A THIN FILM PLASTIC IN A REPLICA PROCESS FOR PROVIDING M. JUNE 6, 1978.
4,101,365.—PROCESS OF MAKING HIGH SPEED MULTIFACETED POLYGONAL SCANNERS. JULY 18, 1978.
4,122,352.—SCANNING ARRAY CONFIGURATION. OCT. 24, 1978.
4,140,903.—PRECISION SPEED CONTROL FOR OPTICAL SCANNERS. FEB. 20, 1979.
4,143,311.—HYSTERESIS SYNCHRONOUS MOTOR RATE SERVO SYSTEM. MAR. 6, 1979.
4,146,786.—SCANNER WITH MODULAR ARRAY OF PHOTOCELLS. MAR. 27, 1979.
4,149090.—CROSSOVER ARRANGEMENT FOR MULTIPLE SCANNING ARRAYS. APR. 10, 1979.
4,149,091.—SCANNING APPARATUS. APR. 10, 1979.
4,150,402.—METHOD AND APPARATUS FOR REDUCING THE EFFECT OF LASER NOISE IN A SCANNING LASER READ SYSTEM. APR. 17, 1979.
4,162,121.—LINEAR ARRAY MODULATOR. JULY 24, 1979.
4,179,620.—CROSSOVER ARRANGEMENT FOR MULTIPLE SCANNING ARRAYS. DEC. 18, 1979.
4,179,621.—SCANNING APPARATUS. DEC. 18, 1979.
4,200,788.—MODULAR ARRAY. APR. 29, 1980.
4,204,230.—HIGH RESOLUTION INPUT SCANNER USING A TWO DIMENSIONAL DETECTOR ARRAY. MAY 20, 1980.
4,205,100.—A SYSTEM FOR PROVIDING ELECTROLESSLY NICKEL COATED POLISHED HIGH SPEED MULTI-FACETED POLYGONAL SCANNER. MAY 27, 1980.
4,213,157.—SELF TRACKING LASER SCANNING APPRATUS. JULY 15, 1980.

Class 17E 2

3,407,329.—SCANNED CONVERSION TUBE. OCT. 22, 1968. CAN. 0836783, GER. 1639461, GRB. 1190967, JAP. 0565840.
3,437,408.—MULTIPLE COPY ELECTROSTATIC IMAGING APPARATUS. APR. 8, 1969. ARG. 0164840, ATR. 0283115, AUS. 0410817, BEL. 0704323, CAN. 0831674, CZC. 0156411, EGR. 0065587, FRA. 1538197, GER. 1597879, GRB. 1202583, HUN. 0161168, ITL. 0822157, JAP. 0582502, MEX. 0099950, SPN. 0345482, STZ. 0484459, SWD. 0331795, USR. 0353450, VZL. 0023662.
3,474,417.—FIELD EFFECT SOLID STATE IMAGE PICKUP AND STORAGE DEVICE. OCT. 21, 1969. CAN. 0869188, GER. 1549144, GRB. 1203095, JAP. 0568732.
3,523,188.—SEMICONDUCTOR CURRENT CONTROL DEVICE AND METHOD. AUG. 4, 1970.

4,147,928.—SCANNING ARRAY CONFIGURATION. APR. 3, 1979.

Class 17E 3

3,485,945.—ELECTRONIC LENTICULAR RECORDING SYSTEM. DEC. 23, 1969.
3,510,570.—ELECTRONIC LENTICULAR DISPLAY SYS. MAY 5, 1970.
3,650,621.—OPTICAL IMAGING SYSTEM. MAR. 21, 1972. BEL. 0747978, CAN. 0927470, FRA. 7011548, GRB. 1297907, ITL. 0898936, JAP. 0731225.
3,655,284.—LONGITUDINALLY INSENSITIVE LENS STRIP IMAGING DEVICE. APR. 11, 1972.
3,827,062.—OPTICAL ARRANGEMENT FOR HIGH SPEED PRINTOUT SYSTEM. JULY 30, 1974.
3,853,387.—VARIABLE MAGNIFICATION LENS ASSEMBLY HAVING TWO ADD LENSES. DEC. 10, 1974.
3,865,470.—VARIABLE MAGNIFICATION LENS SYSTEM. FEB. 11, 1975. BEL. 0819497, FRA. 7429827, SPN. 0429431.

Class 17E 4

3,279,342.—COMMUNICATION PRINTER. OCT. 18, 1966. CAN. 0767902, GRB. 1120446, JAP. 0698291.
3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.
3,485,546.—FIELD FLATTENER SCANNING MEANS. DEC. 23, 1969. CAN. 0850916, GRB. 1196373, JAP. 0667705.
3,504,960.—SAGITTAL RAY APERTURE STOP. APR. 7, 1970. AUS. 0413558, BEL. 0704924, CAN. 0849815, FRA. 1540700, GRB. 1209472, ITL. 0814606, JAP. 0972613.
3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.
3,544,190.—LENS STRIP OPTICAL SCANNING SYSTEM. DEC. 1, 1970. CAN. 0904070, GRB. 1278336.
3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.
3,584,952.—LENS STRIP OPTICAL SCANNING SYSTEM - REISSUED D 2074R. JUNE 15, 1971.
3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.
3,963,343.—CAMMING SYSTEMS. JUNE 15, 1976. BEL. 0824049.
4,006,648.—CAMMING SYSTEM. FEB. 8, 1977. BEL. 0824049.
4,054,359.—APPARATUS FOR SYNCHRONOUSLY SCANNING A FLAT PLATEN WITH A ROTATING MIRROR USING PULLEYS. OCT. 18, 1977.
4,067,640.—APPARATUS FOR SYNCHRONOUSLY SCANNING A FLAT PLATEN WITH A ROTATING MIRROR. JAN. 10, 1978.
4,130,838.—SPEED CONTROL APPARATUS FOR SCANNING SYSTEM. DEC. 19, 1978.
4,170.028.—FACET TRACKING IN LASER SCANNING. OCT. 2, 1979. BEL. 865751.

Class 17E 5

3,155,022.—BUFFER FOR ELECTRONIC DISPLAY READOUT. NOV. 3, 1964. CAN. 0773751, GRB. 1056114, JAP. 0542586.
3,219,993.—IMAGE FORMATION AND DISPLAY UTILIZING A THERMOTROPICALLY COLOR REVERSIBLE MATERIAL. NOV. 23, 1965. CAN. 0762159, GER. 1222795, ITL. 0753655, JAP. 0474129.
3,249,757.—THERMAL IMAGING DEVICE. MAY 3, 1966.
3,995,278.—SUPERCONDUCTIVE MAGNETOSTATIC PRINTER. NOV. 30, 1976.

Class 17E 6

3,456,074.—IMAGE STABILIZATION OF OPTICAL IMAGING SYSTEMS. JULY 15, 1969.
3,461,227.—MECHANICAL JITTER EQUALIZER. AUG. 12, 1969. CAN. 0824819, GRB. 1198303.
3,873,189.—ADJUSTABLE-POSITION OPTICAL SYSTEM. MAR. 25, 1975.

Class 17F 1

3,325,674.—MOVING TARGET DISPLAY INDICATOR. JUNE 13, 1967.
3,340,419.—ELECTRIC DISCHARGE TUBES. SEPT. 5, 1967. CAN. 0773690.
3,447,026.—CRT SCAN STABILIZER. MAY 27, 1969. GER. 1490986.
3,483,414.—STORG TUBE HVG FLD EFF LAYR W/ CONDCTG PINS EXT TO LAYR THAT READOUT NOT ERASE CHG PATTERN. DEC. 9, 1969. CAN. 0850846, GER. 1537566, GRB. 1203432, JAP. 0565841.

Class 17F 2

3,153,785.—TIME COMPRESSED DISPLAY. OCT. 20, 1964. CAN. 0708306, GRB. 1008993.
3,579,024.—SELECTIVE BLANKING CONTROL CIRCUIT. MAY 18, 1971.

Class 17G

3,619,714.—PANEL DISPLAY DEVICE. NOV. 9, 1971.
4,003,742.—VELOCITY COMPENSATION FOR BEAD BYPASS WITH SPEED REDUCTION. JAN. 18, 1977.

Class 17G 1

3,459,946.—SOLID STATE STORAGE DEVICE. AUG. 5, 1969.
3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.
3,539,862.—DUAL CONDUCTOR STORAGE PANEL. NOV. 10, 1970. ARG. 0175067, AUS. 0414034, BEL. 0723721, CAN. 0878168, FRA. 1591040, GER. 1808238, GRB. 1235310, HOL. 0150616, ITL. 0847618, JAP. 0742515, MEX. 0111871, SPN. 0360366, STZ. 0493930, SWD. 0345341, VZL. 0023718.
4,002,998.—EXTERNALLY CONTROLLABLE MINIATURE LASERS. JAN. 11, 1977.
4,085,321.—MULTIPHASE PHOTOACTIVATED SWITCH. APR. 18, 1978.

Class 17G 2

3,531,647.—DEVICE AND PROCESS FOR REDUCTION OF BACKGROUND LIGHT IN SOLID STATE STORAGE PANELS. SEPT. 29, 1970. CAN. 0862333, FRA. 1540063, GER. 1549143, GRB. 1201375, ITL. 0818126, MEX. 0101197.
3,531,648.—SOLID STATE STORAGE PANEL FOR COLOR REPRODUCTION. SEPT. 29, 1970. CAN. 0846433, GRB. 1201377.
3,540,008.—SOLID STATE STORAGE DEVICES HAVING NON-CORONA EXTINCTION CAPABILITY. NOV. 10, 1970. ARG. 0166245, AUS. 0424286, BEL. 0725616, CAN. 0897827, FRA. 1599275, GER. 1815243, GRB. 1250023, ITL. 0849327, JAP. 0742516, MEX. 0106020, SPN. 0361652, STZ. 0504755, SWD. 0361123, VZL. 0023729.
3,561,964.—METHOD FOR PRODUCTION OF SOLID STATE STORAGE PANELS. FEB. 9, 1971. ARG. 0184633, AUS. 0427883, BEL. 0736077, CAN. 0866994, FRA. 6924001, GER. 1935763, GRB. 1270845, HOL. 0150271, ITL. 0870080, JAP. 0681942, MEX. 0113574, SPN. 0369656, STZ. 0513430, SWD. 0358991, VZL. 0023743.
3,594,610.—DISPLAY PANEL WITH CORONA DISCHARGE CONTROL. JULY 20, 1971.

Class 17G 3

3,154,636.—THREE DIMENSIONAL DISPLAY DEVICE. OCT. 27, 1964. CAN. 0794989, GRB. 1029611, JAP. 0462394.
3,205,403.—ELECTROLUMINESCENT DISPLAY SYSTEMS. SEPT. 7, 1965.
3,221,335.—ELECTRO-OPTICAL RECORDING AND VISUAL DISPLAY SYSTEMS. NOV. 30, 1965. AUS. 0226551, CAN. 0801882, FRA. 1202340, GER. 1107705, GRB. 0880692, JAP. 0306714.
3,989,355.—ELECTRO-OPTIC DISPLAY SYSTEM. NOV. 2, 1976.

Class 17G 4

3,293,441.—IMAGE INTENSIFIER WITH FERRO-ELECTRIC LAYER AND BALANCED IMPEDANCES. DEC. 20, 1966.
3,300,645.—FERROELECTRIC IMAGE INTENSIFIER INCLUDING INVERSE FEEDBACK MEANS. JAN. 24, 1967.
3,440,428.—IMAGE CONVERTER USING CHARGED PHOTOEMISSIVE LAYER. APR. 22, 1969. CAN. 0858119, GER. 1639462, GRB. 1202049, JAP. 0565839.
3,441,736.—IMAGE INTENSIFIER INCLUDING SEMICONDUCTOR AMPLIFIER LAYER. APR. 29, 1969.
3,531,646.—ENHANCEMENT OF ELECTROSTATIC IMAGES. SEPT. 29, 1970. CAN. 0892186, GRB. 1199462, JAP. 0641476.
3,543,032.—DEVICE AND PROCESS FOR AMPLIFYING AND STORING AN IMAGE. NOV. 24, 1970. ARG. 0177440, CAN. 0880586, MEX. 0111518, PNM. 0001809, VZL. 0027508.

Class 17H

3,742,281.—CONTROLLED SPECTRUM FLASH LAMP. JUNE 26, 1973.
3,949,979.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. APR. 13, 1976.
3,995,110.—FLYING SPOT SCANNER WITH PLURAL LENS CORRECTION. NOV. 30, 1976.
4,021,845.—A LASER FOR GENERATING WHITE LIGHT. MAY 3, 1977. BEL. 0846954.
4,040,096.—FLYING SPOT SCANNER WITH RUNOUT CORRECTION. AUG. 2, 1977.
4,065,731.—TANDEM LASER ASSEMBLY. DEC. 27, 1977.
4,084,197.—FLYING SPOT SCANNER WITH SCAN DETECTION. APR. 11, 1978.
4,132,960.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. JAN. 2, 1979.
4,184,170.—LIGHT EMITTING DIODE. JAN. 15, 1980.

Class 17H 1

3,427,564.—HIGH-POWER IONIZED GAS LASER STRUCTURE. FEB. 11, 1969.
3,437,950.—ION LASER HAVING A METAL TUBE SHRINK-FITTED ONTO THE CERAMIC DISCHARGE TUBE. APR. 8, 1969.
3,523,256.—HEAT PUMPED LASER. AUG. 4, 1970.
3,529,261.—LASR HVNG ACTV MEDIUM WHCH IS AN EXCTD HALOGN WHSE LOWR ENRGY ST IS DEPLETD BY REACTNG W/ALKAL. SEPT. 15, 1970. CAN. 0816276, FRA. 1446601, GER. 1299367, GRB. 1124346, ITL. 0726918.
3,562,173.—LASER MATERIALS. FEB. 9, 1971.
3,860,888.—TIME-SHARING TWO FREQUENCY LASER. JAN. 14, 1975.
3,954,534.—LIGHT EMITTING DIODE ARRAY WITH DOME GEOMETRY. MAY 4, 1976.
3,969,686.—BEAM COLUMNATION USING MULTIPLE COUPLED ELEMENTS. JULY 13, 1976.
3,970,958.—ELECTRICALLY PUMPED SOLID-STATE DISTRIBUTED FEEDBACK LASER WITH PATICULAR GRATING SPACING. JULY 20, 1976. BEL. 0834484.
3,978,428.—BURIED-HETEROSTRUCTURE DIODE INJECTION LASER. AUG. 31, 1976.
4,006,432.—INTEGRATED GRATING OUTPUT COUPLER IN DIODE LASERS. FEB. 1, 1977. BEL. 0834480.
4,023,993.—METHOD OF MAKING AN ELECTRICALLY PUMPED SOLID STATE DISTRIBUTED FEEDBACK LASER. MAY 17, 1977. BEL. 0832000, SPN. 0440361.
4,033,796.—METHOD OF MAKING BURIED-HETEROSTRUCTURE DIODE INJECTION LASER. JULY 5, 1977.
4,045,749.—CORRUGATION COUPLED TWIN GUIDE LASER. AUG. 30, 1977.
4,052,680.—METAL VAPOR LASER HAVING CAPTAPHORESIS MEANS. OCT. 4, 1977.
4,063,189.—LEAKY WAVE DIODE LASER. DEC. 13, 1977.
4,099,999.—METHOD OF MAKING ETCHED-STRIPED SUBSTRATE PLANAR LASER. JULY 11, 1978.
4,105,954.—DOUBLE-CONFINED MULTIPLE ANODE HOLLOW CATHODE LASER. AUG. 8, 1978.
4,111,521.—SEMICONDUCTOR LIGHT REFLECTOR/LIGHT TRANSMITTER. SEPT. 5, 1978.
4,112,389.—DIODE LASER WITH RING REFLECTOR. SEPT. 5, 1978.
4,122,409.—METHOD AND APPARATUS FOR CONTROLLING THE INTENSITY OF A LASER OUTPUT BEAM. OCT. 24, 1978. BEL. 852044.
4,149,779.—INTERNAL LASER MIRROR ALIGNMENT FIXTURE. APR. 17, 1979.
4,185,256.—MODE CONTROL OF HETEROJUNCTION INJECTION LASERS AND METHOD OF FABRICATION. JAN. 22, 1980.
4,187,474.—IMPROVED METAL VAPOR LASER DISCHARGE TUBE. FEB. 5, 1980.
4,193,042.—SELF-CONFINED HOLLOW CATHODE LASER. MAR. 11, 1980.

Class 17H 2

3,296,541.—BROADBND TRVLNG WAVE MASER W/BOTH MASER AND ISOLATOR CRYSTALS CUT ATDFRNT ANGLES TO OPTICAL AXIS. JAN. 3, 1967.
3,983,509.—DISTRIBUTED FEEDBACK DIODE LASER. SEPT. 28, 1976.

Class 17H 3

3,258,597.—LASER HETERODYNE COMMUNICATION SYSTEM. JUNE 28, 1966.
3,465,166.—FAR INFRA-RED COHERENT LIGHT GENERATOR. SEPT. 2, 1969.
3,499,159.—POLYCHROMATIC LASER AEROSOL SIZING AND RANGING-PLASAR-TECHNIQUE. MAR. 3, 1970.
3,500,236.—LASER STABILIZING SYSTEM. MAR. 10, 1970.
3,534,289.—LASER SYSTEM WITH OPTICAL DISCRIMINATOR. OCT. 13, 1970.
3,753,144.—GAS LASER STRUCTURE. AUG. 14, 1973.
3,909,254.—LASER RECORDING METHOD. SEPT. 30, 1975.
4,012,776.—LUMINESCENT SCREEN LASER SCANNING TECHNIQUE. MAR. 15, 1977.
4,070,089.—TWO DIMENSIONAL LASER SCANNER WITH MOVABLE CYLINDER LENS. JAN. 24, 1978.
4,100,408.—SIGNAL GENERATOR FOR RASTER TYPE SCANNERS. JULY 11, 1978.
4,106,844.—LASER SCANNING SYSTEM USING COMPUTER-GENERATED HOLOGRAMS. AUG. 15, 1978.
4,143,311.—HYSTERESIS SYNCHRONOUS MOTOR RATE SERVO SYSTEM. MAR. 6, 1979.
4,169,275.—REPRODUCTION SCANNING SYSTEM HAVING INTERMEDIATE STORAGE BETWEEN INPUT AND OUTPUT SCANNING STATIONS. SEPT. 25, 1979.
4,170,028.—FACET TRACKING IN LASER SCANNING. OCT. 2, 1979. BEL. 856751.
4,205,348.—LASER SCANNING UTILIZING FACET BRACKING AND ACOUSTAL PULSE IMAGING TECHNIQUES. MAY 27, 1980.
4,205,350.—REPRODUCTION SCANNING SYSTEM HAVING INTERMEDIATE STORAGE BETWEEN INPUT AND OUTPUT SCANNING STATIONS. MAY 27, 1980.
4,213,158.—OPTICAL DATA RECORDING SYSTEM UTILIZING ACOUSTIC PULSE IMAGING TO MINIMIZE IMAGE BLUR. JULY 15, 1980.

Class 17I

3,630,598.—OPTICAL DEMODULATION FILTER. DEC. 28, 1971. BEL. 0761134, CAN. 0904628, GRB. 1330709, ITL. 0914073, JAP. 0770139.
3,650,605.—INTERFERAMETRIC APPARATUS WITH CONTROLLED SCANNING MEANS. MAR. 21, 1972. CAN. 0952749.
3,687,535.—OPTICAL DEMODULATION SYSTEM. AUG. 29, 1972. BEL. 0762859, CAN. 0944075, FRA. 7105649, GRB. 1343483, ITL. 0918450.
3,689,267.—SCREEN MAKING PROCESS UTILIZING ROTATION OF OPTICAL PLATE. SEPT. 5, 1972. CAN. 0950736.
3,697,184.—APPARATUS FOR EVALUATING THE RECORDING CHARACTERISTICS OF A THERMOPLASTIC PHOTORECEPTOR. OCT. 10, 1972. CAN. 1003484, GRB. 1389471.
3,776,995.—METHOD OF PRODUCING X-RAY DIFFRACTION GRATING. DEC. 4, 1973. CAN. 0944871, GRB. 1363262.
4,066,335.—VARIABLE DENSITY LENS. JAN. 3, 1978.

Class 17I 1

3,191,440.—PRESSURE GAUGE INSTRUMENT. JUNE 29, 1965.
3,249,760.—PRESSURE GAUGE INSTRUMENT. MAY 3, 1966.

Class 17I 2

3,416,865.—OPTICAL DENSITY MEASURING SYSTEM. DEC. 17, 1968.
3,609,047.—SINGLE BEAM PHOTOMETER SYSTEM WHEREIN THE ABSORBANCE OF A SAMPLE IS DETERMINED RELATIVE TO REFE. SEPT. 28, 1971.
4,054,391.—SPECULAR REFLECTANCE MICRODENSITOMETER. OCT. 18, 1977.

Class 17I 3

3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,697,063.—DOCUMENT HANDLING APPARATUS. OCT. 10, 1972. GRB. 1369618.
4,128,332.—ILLUMINATOR. DEC. 5, 1978. GRB. 1494424.

Class 17J

D.236,733.—CURSOR POSITION CONTROLLER. SEPT. 9, 1975.
3,447,030.—COLD SEAL LAMP PRESSURE REGULATION. MAY 27, 1969.
3,642,377.—COLOR PRINTING SYSTEM. FEB. 15, 1972.
3,733,123.—METHOD AND APPARATUS FOR ENCLOSING A LAMP. MAY 15, 1973. ARG. 0198292, AUS. 0466394, BEL. 0789338, FRA. 7234198, GRB. 1410046, ITL. 0967625, MEX. 0128585, SPN. 0409972, STZ. 0549825, SWD. 0360935.
3,775,006.—APPARATUS FOR OPTICAL COLOR SEPARATION. NOV. 27, 1973.
3,795,805.—APPARATUS FOR TESTING A CREDIT CARD. MAR. 5, 1974.
3,873,813.—CREDIT CARD. MAR. 25, 1975.
3,892,963.—TRANSDUCER FOR A DISPLAY-ORIENTED POINTING DEVICE. JULY 1, 1975. FRA. 7440265.
3,915,553.—ELECTROOPTIC COLOR FILTER SYSTEM. OCT. 28, 1975.
3,936,179.—SUPPORT STRUCTURE FOR A DUPLICATOR OPTICAL SYSTEM. FEB. 3, 1976.
3,951,521.—REVERSIBLE RADIANT ENERGY FILTER AND PROCESS OF USING SAME. APR. 20, 1976.
3,977,785.—METHOD & APP FOR INHIBITING THE OPERATION OF A COPYING MACHINE. AUG. 31, 1976.
4,071,323.—DIFFUSION CRUCIBLE AND SLAB MEMBER WITH COMMON METAL COMPONENT IN THE VAPOR PHASE. JAN. 31, 1978.
4,071,396.—CONTROLLED ATMOSPHERE PROCESS FOR ALTERING THE NONSTOICHIOMETRY OF CRYSTALLINE MEMBERS. JAN. 31, 1978.
4,183,094.—OPTICAL STORAGE MEDIUM USING THE FREQUENCY DOMAIN. JAN. 8, 1980.
4,184,170.—LIGHT EMITTING DIODE. JAN. 15, 1980.

Class 18

3,736,133.—TRANSPARENT INK - ABSORBENT LAQUERS. MAY 29, 1973. ARG. 0193996, CAN. 0985583. GRB. 1390137, MEX. 0127276. VZL. 0033577.
3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATINAIN. JUNE 12, 1973.
3,860,484.—ENZYME STABILIZATION. JAN. 14, 1975.
3,985,666.—PLASTIC MATERIALS MIXED WITH POLAR GROUP CONTAINING MATERIALS. OCT. 12, 1976. ARG. 0195541, BEL. 0781970, CAN. 0976742, FRA. 7213873, GRB. 1396141, ITL. 0951326, MEX. 0126158, VZL. 0032937.
4,080,332.—ELECTRICALLY CONDUCTIVE COMPOUNDS. MAR. 21, 1978.

Class 18A

3,238,150.—PHOTOCONDUCTIVE CADMIUM SULFIDE POWDER AND METHOD FOR THE PREPARATION THEREOF. MAR. 1, 1966. CAN. 0712516, GRB. 1062022, JAP. 0486530.
3,402,177.—SUBSTITUTED 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRPOCOLINES. SEPT. 17, 1968. AUS. 0435189, BEL. 0743896, CAN. 0812820, GRB. 1145373.
3,471,290.—PHOTOCHROMIC PHOTORESIST IMAGING. OCT. 7, 1969.
3,478,064.—1,5-BIS-SUBSTITUTED ALKYLAMINO-ANTHRAQUINONES. NOV. 11, 1969. ARG. 0145636, AUS. 0419687, BEL. 0683222, CAN. 0880309, FRA. 1484968, GRB. 1155986, ITL. 0771955, JAP. 0581828, MEX. 0092775, SPN. 0328428, STZ. 0461273, SWD. 0328188, VZL. 0021224.
3,482,973.—IMAGING SYSTEM. DEC. 9, 1969.
3,485,633.—ELECTROPHORETIC IMG PROC EMPL METALLIC LAKES OF FLUCRESCEIN DERIVATIVES AS ELECTRICLY PHOTOSENS. DEC. 23, 1969. AUS. 0444394, BEL. 0743641, CAN. 0848386, GER. 1572387, GRB. 1190965. JAP. 0586923.
3,562,248.—BISAZC FGMTS DRVD CPLRS CBTC CONDG 8-AMINO-2-NAPHTHOLS W/ DICARBOXYLIC ACID CHLORIDES. FEB. 9, 1971. ATR. 0302037, AUS. 0435392, BEL. 0743422, CAN. 0889836, FRA. 6944290, GER. 1717183, GRB. 1217905, ITL. 0879047, JAP. 0608727.
3,667,943.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972. ARG. 0184823, AUS. 0452663, BEL. 0737810, CAN. 0877882, EGR. 0077411, FRA. 6928700, GRB. 1278702, ITL. 0888005, .JAP. 0683893, SPN. 0370720, STZ. 0519183, SWD. 0346396, TIW. 0005517, USR. 0351396.
3,667,944.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC RECORDING. JUNE 6, 1972. ARG. 0177369, AUS. 0452031, BEL. 0741159, CAN. 0884807, FRA. 6937223, GRB. 1286079, ITL. 0879710, JAP. 0693421, MEX. 0115407.
3,667,945.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972.
3,671,467.—SELENIUM CONTAINING POLYMERS. JUNE 20, 1972. ARG. 0190619, BEL. 0770689, CAN. 0941544, FRA. 7128500, GRB. 1364297, ITL. 9308410, SPN. 0393651. VZL. 0029342.
3,694,201.—METHOD FOR PHOTOCONDUCTIVE POWDER. SEPT. 26, 1972. BEL. 0777717, CAN. 0982808, FRA. 7201003, GRB. 1381162, ITL. 0946352.
3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, CAN. 0996931, GRB. 1396922, ITL. 0955644, MEX. 0128928.
3,708,293.—PI-FORM METAL-FREE PHTHALOCYANINE. JAN. 2, 1973. ARG. 0195167, BEL. 0783792, CAN. 0995211, GRB. 1395769, ITL. 0955643, MEX. 0131970, VZL. 0034272.
3,837,850.—PHOTOCONDUCTIVE BUTILE TITANIUM DIOXIDE. SEPT. 24, 1974.
3,867,145.—METHANOL AND HEAT TREATED ZINC OXIDE. FEB. 18, 1975.
3,905,958.—SELENIUM COMPOUNDS. SEPT. 16, 1975.
3,965,049.—ONE-STEP SYNTHESIS OF AROMATIC ORGANIC DISELENIDES. JUNE 22, 1976.
4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.
4,007,100.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.
4,007,101.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.
4,013,528.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.
4,013,529.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.
4,013,530.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.
4,014,768.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 29, 1977.
4,016,058.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. APR. 5, 1977.
4,028,203.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 7, 1977.
4,030,991.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.
4,030,992.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.
4,030,993.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.
4,046,564.—ELECTROPHOTOGRAPHIC IMAGING MEMBERS WITH PHOTOCONDUCTIVE LAYER CONTAINING ELECTRON ACCEPTOR. SEPT. 6, 1977.
4,047,947.—PROCESS FOR THE PREPARATION OF TRANSPARENCIES BY SELECTIVE DECOMPOSITION OF AN ORGANOSELENI. SEPT. 13, 1977.
4,075,012..—INTRACHAIN CHARGE TRANSFER COMPLEXES USE IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 21, 1978.
4,098,984.—ELECTRON ACCEPTOR POLYMERS. JULY 4, 1978.
4,116,691.—ELECTROPHOTOGRAPHIC IMAGING MEMBER OF MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS. SEPT. 26, 1978.
4,122,113.—9-FLUORENYL ACRYLATES. OCT. 24, 1978.
4,129,581.—MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS-PROCESS FOR PREPARATION AND USE. DEC. 12, 1978.
4,143,225.—HOMOPOLYMERS OF A FLUORENONE DERIVATIVE HAVING PENDANT ELECTRON ACCEPTOR GROUPS. MAR. 6, 1979.
4,172,933.—MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS—PROCESS FOR PREPARATION AND USE. OCT. 30, 1979.

Class 18A 1

3,384,488.—POLYCHROMATIC PHOTOELECTROPHORETIC IMAGING COMPOSITION. MAY 21, 1968.

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.
3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MITS IN ELCPHG. JUNE 3, 1969.
3,531,309.—COMPOSITIONS COMPRISING 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRROCOLINES AND A CARRIER. SEPT. 29, 1970.
3,546,085.—PHOTOELECTROPHORETIC IMAGING PROCESS AND SUSPENSION. DEC. 8, 1970. BEL. 0710052, CAN. 0875493, FRA. 1568088, GER. 1622380, GRB. 1208812, ITL. 0823929, JAP. 0594741.

Class 18A 2

3,492,308.—PROCESS FOR PREPARING METAL FREE PHTHALOCYANINES - SYNTHESIS OF METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0922708, GRB. 1216887, JAP. 0586926.
3,492,309.—SYNTHESIS OF ALPHA METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0894803, GRB. 1206306, JAP. 0604155.
3,509,146.—PROCESS OF PREPARING PHTHALOCYANINE AND HETEROCYCLIC ANALOGUES. APR. 28, 1970. CAN. 0865117, GRB. 1232241, JAP. 0587395.
3,672,979.—METHOD OF PRODUCING A PHTHALOCYANINE PHOTOCONDUCTIVE LAYER. JUNE 27, 1972. ARG. 0184673, AUS. 0457271, BEL. 0761135, CAN. 0951697, FRA. 7047702, GRB. 1334060, ITL. 0914074, JAP. 0753795, MEX. 0119529, PLD. 0082204, PNM. 0002191, SPN. 0386759, STZ. 0571731, TIW. 0007180, VZL. 0032789.
3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.
4,107,389.—FUSING SURFACE. AUG. 15, 1978. GRB. 1511272.
4,126,722.—FUSING SURFACE. NOV. 21, 1978. GRB. 1511272.
4,197,242.—POTASSIUM PHTHALOCYANINE COMPLEXES, METHOD OF PREPARATION, AND PHTHALOCYANINE PURIFICATION PROCESSES. APR. 8, 1980.

Class 18A 2A

RE.27,117.—METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-RE OF 3,357,989-D1170. APR. 20, 1971.
3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.
3,657,272.—PROCESS FOR PREPARING X-FORM METAL FREE PHTHALOCYANINE. APR. 18, 1972.
3,816,118.—ELECTROPHOTOGRAPHIC ELEMENT CONTAINING PHTHALOCYANINE. JUNE 11, 1974. ARG. 0156316, CAN. 0890855, FRA. 0091579, GRB. 1175451, ITL. 0809972, JAP. 0820183, MEX. 0115884, VZL. 0024012.
3,862,127.—PROCESS. JAN. 21, 1975. AUS. 0453518, BEL. 0754407, FRA. 7028418, GRB. 1268574, ITL. 0929169, JAP. 0727963, SPN. 0382366.
3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.
3,927,026.—PROCESS OF MAKING X-FORM METAL PHTHALOCYANINE. DEC. 16, 1975. CAN. 0916703, GRB. 1312946, JAP. 0693981.
3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.
3,932,454.—PROCESS OF MAKING HEXAGONAL ALPHA METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. CAN. 0918152, GRB. 1327084, JAP. 0752724.
4,031,109.—METHOD FOR THE PREPARATION OF X-FORM METAL PHTHALOCYANINE AND X-FORM METAL FREE COMPOUNDS. JUNE 21, 1977. ARG. 0188048.
4,098,795.—METHOD FOR THE PREPARATION OF X-FORM METAL FREE PHTHALOCYAMINE. JULY 4, 1978. ARG. 182328, BEL. 737989, CAN. 899870, FRA. 6928871, GER. 1943381, GRB. 1280843, ITL. 870314, JAP. 654041, MEX. 116011.

Class 18A 3

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.
3,448,028.—N-SBSTUD-8, 13-DIOXODINAPHTHO-2-1-B, 2, 3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

Class 18A 4

3,384,632.—ARYLAZO-4-ISOPROPOXY-1-NAPHTHOL COMPOUNDS. MAY 21, 1968. BEL. 0743897, CAN. 0787920, FRA. 1473703, GER. 1644400, GRB. 1145374, ITL. 0764015, JAP. 0578398.
3,574,182.—CALCIUM SALT OF 6-BROMO-1-1-SULFO-2-NAPHTHYLAZO-2-NAPHTHOL. APR. 6, 1971. ARG. 0168131, ATR. 0302812, AUS. 0429649, BEL. 0710053, CAN. 0878483, CHL. 0024254, CLB. 0018785, DNK. 0128493, FIN. 0049711, FRA. 1556484, GRB. 1197374, GRK. 0036648, IND. 0114221, ISR. 0029376, ITL. 0823989, JAP. 0605213, LXB. 0055364, MEX. 0099564, NOR. 0129593, NZL. 0151403, PRU. 0009483, PTG. 0049036, SAF. 0068559, SPN. 0349965, STZ. 0524844, SWD. 0351737, URG. 0008893, VZL. 0032776.

Class 18B

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, BRA. 6790950, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041. MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.
3,671,467.—SELENIUM CONTAINING POLYMERS. JUNE 20, 1972. ARG. 0190619, BEL. 0770689, CAN. 0941544, FRA. 7128500, GRB. 1364297, ITL. 9308410, SPN. 0393651, VZL. 0029342.
3,725,505.—PYRENE CONTAINING POLYMERS PREPARED BY ANIONIC POLYMERIZATION. APR. 3, 1973. ARG. 0183776, AUS. 0459733, BEL. 0770501, CAN. 0986650, FRA. 7127963, GRB. 1359045, ITL. 0930707, MEX. 0120152, SPN. 0393582, VZL. 0031959.
3,776,760.—METHOD FOR MANUFACTURING A TETRAFLUOROETHLENE POLYMER-COATED ROLL. DEC. 4, 1973. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.
3,852,861.—SURFACES WITH FLUOROCARBON PROCESS FOR MULTIPLE COATING RESINS. DEC. 10, 1974. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.
3,860,484.—ENZYME STABILIZATION. JAN. 14, 1975.
3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. FRA. 7408936, GRB. 1414158, ITL. 1010695, TIW. 0008534.
3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436, FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.
3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975. FRA. 7403086, GRB. 1446966.
3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.
3,883,488.—2-VINYL-9-DICYANOMETHYLENE-FLUORENE AND DERIVATIVES THEREOF. MAY 13, 1975.
3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 099593, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382..
3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.
3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975. ITL. 1010430.
3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.
3,950,168.—FIXING POWDER IMAGES-FUSING AIDES FOR HYBRID FIX. APR. 13, 1976.
3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.
3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976. FRA. 7403086, GRB. 1446966.
3,965,049.—ONE-STEP SYNTHESIS OF AROMATIC ORGANIC DISELENIDES. JUNE 22, 1976.
3,967,962.—DEVELOPING WITH TONER POLYMER HAVING CRYSTALLINE AND AMORPHOUS SEGMENTS. JULY 6, 1976.
3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436. FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.
3,994,994.—IMPROVED PROCESS FOR PREPARATION OF BLOCK COPOLYMERS FROM VINYLCARBOZOLES & OTHER ADDITION MONO. NOV. 30, 1976.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.
4,009,151.—POLYMERS OF 2-VINLYFLUORENONE AND DERIVATIVES THEREOF. FEB. 22, 1977.
4,011,266.—2-VINYL-FLUORENONE AND DERIVATIVES THEREOF. MAR. 8, 1977.
4,045,413.—POSSIBLE ACTIVE MATRIX POLYMERS. AUG. 30, 1977. FRA. 7432710.
4,046,564.—ELECTROPHOTOGRAPHIC IMAGING MEMBERS WITH PHOTOCONDUCTIVE LAYER CONTAINING ELECTRON ACCEPTOR. SEPT. 6, 1977.
4,071,670.—METHOD OF SIZING MONOMER DROPLETS FOR SUSPENSION POLYMERIZATION TO FORM SMALL PARTICLES. JAN. 31, 1978. BEL. 857223.
4,075,012.—INTRACHAIN CHARGE TRANSFER COMPLEXES USE IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 21, 1978.
4,098,984.—ELECTRON ACCEPTOR POLYMERS. JULY 4, 1978.
4,116,691.—ELECTROPHOTOGRAPHIC IMAGING MEMBER OF MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS. SEPT. 26, 1978.
4,122,113.—9-FLUORENYL ACRYLATES. OCT. 24, 1978.
4,129,581.—MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS-PROCESS FOR PREPARATION AND USE. DEC. 12, 1978.
4,143,225.—HOMOPOLYMERS OF A FLUORENONE DERIVATIVE HAVING PENDANT ELECTRON ACCEPTOR GROUPS. MAR. 6, 1979.
4,172,933.—MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS—PROCESS FOR PREPARATION AND USE. OCT. 30, 1979.

Class 18C

4,074,143.—OPTOELECTRONIC DEVICE WITH OPTICAL FEEDBACK. FEB. 14, 1978. FRA. 7631992.

Class 18C 1

RE.27,480.—AUTOMATIC DEVELOPMENT CONTROLLER -RE OF 3,376,854-D986. SEPT. 19, 1972.
3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835. BEL. 0802879, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

Class 18C 1A

3,720,617.—AN ELECTROSTATIC DEVELOPER CONTAINING MODIFIED SILICON DIOXIDE PARTICLES. MAR. 13, 1973. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.
3,819,367.—IMAGING SYSTEM. JUNE 25, 1974. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149. USR. 0460634, VZL. 0032423.
3,820,986.—LIQUID DEVELOPMENT METHOD AND MATERIALS. JUNE 28, 1974.
3,833,364.—METHOD OF DEVELOPING ELECTROSTATIC IMAGE CHARGE. SEPT. 3, 1974.
3,850,830.—LIQUID DEVELOPER CONTAINING EXTENDER BODY PARTICLES. NOV. 26, 1974.
3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924, SPN. 0435074.
4,051,077.—NON FILMING DUAL ADDITIVE DEVELOPER. SEPT. 27, 1977. AUS. 487989, BEL. 825924, FRA. 7505307, GRB. 1494360, SPN. 435074.

Class 18C 1B

3,577,345.—SOLID XEROGRAPHIC DEVELOPER. MAY 4, 1971. ARG. 0172448, ATR. 0325417, AUS. 0424173, BAH. 0000095, BEL. 0716084, BOL. 0032708, CAN. 0902983, CHL. 0025923, CLB. 0017674, DOR. 0001461, ELS. 0001064, FRA. 1567731, GRB. 1232117, GRK. 0037628, GUA. 0002003, HOL. 0148714, IND. 0116209, ISR. 0030116, ITL. 0851653, JAM. 0001848, JAP. 0623002, LXB. 0056197, MEX. 0119320, NOR. 0131653, NZL. 0164353, PNM. 0002062. PRU. 0009911, PTG. 0049749, SPN. 0354686, STZ. 0516180, SWD. 0338238, TIW. 0005096, TRD. 0000057, TRK. 0015620, URG. 0009286, VZL. 0023666.
3,590,000.—SOLID DEVELOPER FOR LATENT ELECTROSTATIC IMAGES. JUNE 29, 1971. ARG. 0172453, ATR. 0288860, BAH. 0000093, BEL. 0716083, BOL. 33998, CAN. 0902984, CHL. 0024050, DOR. 0001460, ECD. 0000198, ELS. 0001062, FRA. 1567721, GER. 1772570, GRB. 1232118, GRK. 0037629, GUA. 0002095, HOL. 0151523, IND. 0116210, ISR. 0030117, ITL. 0851651, JAM. 0002094, JAP. 0655407, LXB. 0056196, MEX. 0104566, NZL. 0164356, PLP. 0007690, PNM. 0002083, PRU. 0009495, PTG. 0049748, SPN. 0354685, STZ. 0519737, SWD. 0357071, TIW. 0004940, TRD. 0000058, TRK. 0015606, URG. 0009287, VZL. 0032392.
3,653,893.—IMAGING SYSTEM. APR. 4, 1972.
3,655,374.—IMAGING PROCESS EMPLOYING NOVEL SOLID DEVELOPER MATERIAL. APR. 11, 1972.
3,681,107.—DEVELOPMENT OF ELECTROSTATOGRAPHIC IMAGES. AUG. 1, 1972.
3,856,692.—LIQUID ELECTROSTOGRAPHIC DEVELOPER COMPOSITIONS. DEC. 24, 1974. CAN. 0940361, GRB. 1332674.
3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924, SPN. 0435074.
3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.
4,002,570.—ELECTROPHOTOGRAPHIC DEVELOPER WITH POLYVINYLIDENE FLUORIDE ADDITIVE. JAN. 11, 1977
4,051,077.—NON FILMING DUAL ADDITIVE DEVELOPER. SEPT. 27, 1977. AUS. 487989, BEL. 825924, FRA. 7505307, GRB. 1494360, SPN. 435074.
4,147,541.—ELECTROSTATIC IMAGING MEMBER WITH ACID LUBRICANT. APR. 3, 1979. AUS. 467835. BEL. 802879. CAN. 995963. FRA. 7328588. GRB. 1437041. ITL. 991465. SPN. 417382. USR. 637099.

Class 18C 2

4,038,076.—ELECTROSTATOGRAPHIC DEVELOPMENT. JULY 26, 1977. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD 7216977.

Class 18C 2A

3,723,114.—THERMOSETTING ELCTRSTGRPHC DVLPR OF CARRIER/PREPOLYMER OF DIALLYL PHTHALATE ISOPHTHALATE AND MXTR. MAR. 27, 1973. ARG. 0185089, BEL. 0762507, CAN. 0970195, FRA. 7104349, GRB. 1344197, ITL. 0918244, MEX. 0122234.
3,806,339.—LIQUID DEVELOPER COMPOSITION. APR. 23, 1974.
3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.
3,965,021.—ELECTROSTATOGRAPHIC DEVELOPMENT-POLYBLEND TONERS. JUNE 22, 1976.
3,967,962.—DEVELOPING WITH TONER POLYMER HAVING CRYSTALLINE AND AMORPHOUS SEGMENTS. JULY 6, 1976.
3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

Class 18C 2A 1

RE.25,136.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR-RE OF 2,940,934-D432. MAR. 13, 1962.
3,079,342.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR. FEB. 26, 1963. ARG. 0157131, CAN. 0726134, GUA. 0001817.
3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 18C 2A 2

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 18C 2B

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.
3,591,503.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 6, 1971. ARG. 0172143. ATR. 0287491, AUS. 0418556, BEL. 0713751, CAN. 0879020, CHL. 0024256, CLB. 0017933, FRA. 1560849, GRB. 1225980, GRK. 0038397, IND. 0115457, ITL. 0833710. LXB. 0055904, MEX. 0111625, NOR. 0128297, NZL. 0152196, PLP. 0008847, PRU. 0009319, PTG. 0049455, SAF. 0682386, SPN. 0352810, STZ. 0508903, SWD. 0333868, URG. 0009139, VZL. 0023688.

3,595,794.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 27, 1971. ARG. 0169109, ATR. 0290986, AUS. 0418156, BEL. 0713752, CAN. 0879021, CHL. 0024482, FRA. 1582855, GRB. 1227471, IND. 0883043, LXB. 0055894, MEX. 0115899, NOR. 0128036, NZL. 0152195, PLP. 0007966, PRU. 0009335, PTG. 0049154, SAF. 0682358, SPN. 0352811, STZ. 0505410, SWD. 0331633, URG. 0009283, VZL. 0023687.

3,627,522.—DEVELOPER COMPOSITION AND METHOD OF USE. DEC. 14, 1971.

3,672,928.—ELECTROSTATOGRAPHIC DEVELOPERS HAVING CARRIERS COMPRISING POLYSTER COATED CORES. JUNE 27, 1972. ARG. 0184669, BEL. 0762415, CAN. 0941209, FRA. 7103845, GRB. 1344365, ITL. 0918191, JAP. 0764506.

3,704,066.—REFLEX EXPOSURE MEDIUM. NOV. 28, 1972.

3,725,283.—ELECTROSTATOGRAPHIC DEVELOPER CONTAINING UNCOATED GLASS CERAMIC CARRIER PARTICLES. APR. 3, 1973. BEL. 0777720, CAN. 0973745, FRA. 7201006, GRB. 1376457, ITL. 0946358.

3,767,578.—CARRIER MATERIAL FOR ELECTROSTATOGRAPHIC. OCT. 23, 1973. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.

3,847,604.—ELECTROSTATIC IMAGING PROCESS USING MODULAR CARRIERS. NOV. 12, 1974. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.

3,849,127.—AN ELECTROSTATOGRAPHIC PROCESS IN WHICH COATED CARRIER PARTICLES ARE USED. NOV. 19, 1974.

3,857,792.—ELECTROSTATIC DEVELOPER MIXTURE WITH A COATED CARRIER. DEC. 31, 1974.

3,914,181.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURES COMPRISING FERRITE CARRIER BEADS. OCT. 21, 1975. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,923,503.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT EMPLOYING STEEL CARRIER PARTICLES. DEC. 2, 1975. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,939,086.—HIGHLY CLASSIFIED OXIDIZED DEVELOPER MATERIAL. FEB. 17, 1976. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155. SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.

3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

4,018,601.—ELECTROSTATOGRAPHIC MAGNETIC BRUSH IMAGING PROCESS EMPLOYING CARRIER BEADS COMPRISING HIGH NICK. APR. 19, 1977.

Class 18C 4

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, BRA. 6790950, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041, MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.

3,526,533.—COATED CARRIER PARTICLES. SEPT. 1, 1970. ARG. 0161341, AUS. 0418867, BEL. 0702404, CAN. 0878413, FRA. 1534184, GRB. 1205051, ITL. 0826203, JAP. 0578401, MEX. 0120334, NOR. 0122818, SPN. 0343903, STZ. 0486054, SWD. 0308987, VZL. 0032393.

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,713,819.—XEROGRAPHIC IMAGING AND DEVELOPMENT USING METAL OXIDE CARRIER PART. JAN. 30, 1973.

3,730,707.—METHOD OF DEVELOPING LATENT IMAGES. MAY 1, 1973.

3,752,666.—ELECTROSTATIC IMAGING PROCESS USING CARRIER BEADS CONTAINING CONDUCTIVE PARTICLES. AUG. 14, 1973.

3,839,029.—ELECTROSTATOGRAPHIC DEVELOPMENT WITH FERRITE DEVELOPER MATERIALS. OCT. 1, 1974. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,849,182.—HIGHLY SHAPE-CLASSIFIED OXIDIZED LOW CARBON HYPEREUTECTOID ELECTROSTATOGRAPHIC STEEL CARRIER PA. NOV. 19, 1974. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978. SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,850,663.—CELLULOSE COATED CARRIERS. NOV. 26, 1974. ARG. 0183677, AUS. 0458322, BEL. 0763987, CAN. 0941210, EGR. 0091603, FRA. 7108585, GRB. 1345027, ITL. 0922292, MEX. 0120027, PNM. 0002440, SAF. 0711547, STZ. 0557050, SWD. 0359940, TIW. 0008177, VZL. 0032931.

3,850,676.—COATED CARRIER PARTICLES FOR ELECTROSTATOGRAPHIC DEVELOPMENT. NOV. 26, 1974.

3,856,519.—TRANSFER OF TONER USING A VOLATILE INSULATING LIQUID. DEC. 24, 1974.

3,900,587.—IMAGING PROCESS EMPLOYING TREATED CARRIER PARTICLES. AUG. 19, 1975. CAN. 1007923.

3,916,064.—DEVELOPER MATERIAL. OCT. 28, 1975.

3,916,065.—ELECTROSTATOGRAPHIC CARRIER PARTICLES. OCT. 28, 1975.

3,989,648.—IMAGING SYSTEM. NOV. 2, 1976. CAN. 1007923.

4,019,903.—ELECTROSTATIC DEVELOPMENT. APR. 26, 1977. BEL. 0777715, CAN. 0973746, FRA. 7201001, GRB. 1376456, ITL. 0946359.

4,035,520.—IMAGING SYSTEMS. JULY 12, 1977

4,040,969.—HIGH SURFACE AREA CARRIER. AUG. 9, 1977. BEL. 829639, GRB. 1497732, SPN. 438084.

4,042,517.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE CONTAINING A THERMOSET ACRYLIC RESIN COATED CARRIER. AUG. 16, 1977.

4,065,585.—RENEWABLE CHOW FUSER COATING. DEC. 27, 1977. GRB. 1490252.

4,066,563.—COPPER - TETRA - 4 - (OCTADECYLSULFONOM- IDO) PHTHALOCYANINE ELECTROPHOTOGRAPHIC CARRIER. JAN. 3, 1978.

4,122,024.—CLASSIFIED TONER MATERIALS. OCT. 24, 1978. BEL. 829719. CAN. 1043149. FRA. 7516758. GRB. 1497731.

4,126,454.—IMAGING PROCESS UTILIZING HIGH SURFACE AREA CARRIER MATERIALS. NOV. 21, 1978.

Class 18C 5

3,788,994.—PRESSURE FIXABLE ELECTROSTATOGRAPHIC TONER. JAN. 29, 1974. ARG. 0200575, BEL. 0793247, CAN. 0985943, FRA. 7244381, GRB. 1406687, ITL. 0973323, SPN. 0410212, STZ. 0028529, VZL. 0032608.

3,804,764.—ELECTROSTATOGRAPHIC PRESSURE SENSITIVE POLYMERIC TONER. APR. 16, 1974. ARG. 0196320, AUS. 0464392, BEL. 0793554, CAN. 1011149, FRA. 7246575, GRB. 1417409, ITL. 0973325, SPN. 0410211, STZ. 0028568.

3,853,778.—TONER COMPOSITION EMPLOYING POLYMER WITH SIDE CHAIN CRYSTALLINITY. DEC. 10, 1974. AUS. 0465653, BEL. 0793639, CAN. 0998869, FRA. 7246888, GRB. 1423291, ITL. 0973330, SPN. 0410267, SWD. 7300003.

3,893,932.—PRESSURE FIXABLE TONER. JULY 8, 1975.

3,893,934.—SOLID DEVELOPER FOR ELECTROSTATIC LATENT IMAGES. JULY 8, 1975.

3,910,846.—METHOD OF PREPARING ELECTROSCOPIC TONER PARTICLES. OCT. 7, 1975. CAN. 0984074.

3,974,078.—AN ELECTROSTATE GRAPHIC DEVELOPMENT OF ENCAPSULATED MATERIALS. AUG. 10, 1976. ARG. 0196318, AUS. 0467046, BEL. 0792115, CAN. 1001884, FRA. 7239134, ITL. 0973326, MEX. 0128768, SPN. 0410205, STZ. 0028567, VZL. 0033139.

4,002,776.—IMAGING PROCESS EMPLOYING TONER PARTICLES CONTAINING ARYLSULPONAMIDE FORMALDEHYDE ADDUCT. JAN. 11, 1977.

4,161,454.—COATING MAGNETITE WITH POLYACID. JULY 17, 1979.

4,176,078.—FIELD DEPENDENT TONER HAVING CHROME COMPLEX COATED MAGNETIC PARTICLES. NOV. 27, 1979.

Class 18C 5A

3,345,293.—COLORED ELECTROSTATOGRAPHIC TONERS CONTAINING ORGANIC DYE PIGMENTS. OCT. 3, 1967. CAN. 0834674, GRB. 1074147, JAP. 0788652.
3,864,125.—ELECTROPHOTOGRAPHIC METHOD OF MAKING AN IMAGING MASTER. FEB. 4, 1975.
3,897,249.—TONERS FOR PHTHALOCYANINE PHOTORECEPTORS. JULY 29, 1975.
4,126,565.—TONERS FOR COLOR FLASH FUSERS CONTAINING A PERMANENT COLORANT AND A HEAT SENSITIVE DYE. NOV. 21, 1978.

Class 18C 5B

3,080,250.—SELF-TACKIFYING XEROGRAPHIC TONER. MAR. 5, 1963.
3,080,318.—THREE-COMPONENT XEROGRAPHIC TONER. MAR. 5, 1963.

Class 18C 6

3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973.
3,790,485.—PROCESS FOR PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPER. FEB. 5, 1974.
3,812,037.—LIQUID DEVELOPER COMPOSITION. MAY 21, 1974.

Class 18C 6A

3,507,686.—METHOD OF COATING CARRIER BEADS. APR. 21, 1970. CAN. 0872190, GRB. 1239621, JAP. 0675782.
3,658,500.—METHOD OF PRODUCING GLASS BEADS FOR ELECTROSTATOGRAPHIC DEVELOPERS. APR. 25, 1972. CAN. 0916536, GRB. 1331485.
3,685,113.—DEVELOPER SYSTEM. AUG. 22, 1972. ARG. 0183679, BEL. 0764635, CAN. 0941211, FRA. 7110751, GRB. 1347568, ITL. 0922132, MEX. 0122432.
3,764,310.—METHOD OF PRODUCING ELECTROSTATOGRAPHIC DEVELOPER. OCT. 9, 1973.
3,789,796.—APPARATUS FOR PRODUCING DEVELOPER MATERIALS. FEB. 5, 1974.
3,908,046.—P-XYLYENE VAPOR PHASE POLYMERIZATION COATING OF ELECTROSTATOGRAPHIC PARTICLES. SEPT. 23, 1975.
3,940,514.—METHOD OF COATING ELECTROSTATOGRAPHIC CARRIER PARTICLES. FEB. 24, 1976.

Class 18C 6B

3,326,848.—SPRAY DRIED LATEX TONERS. JUNE 20, 1967. AUS. 0409084, BEL. 0666056, CAN. 0866260. FRA. 1451366, GRB. 1115653, ITL. 0717377, MEX. 0088140, SWD. 0340046.
3,338,991.—METHOD OF FORMING ELECTROSTATIC TONER PARTICLES. AUG. 29, 1967. FRA. 1450642, GRB. 1115634, HOL. 0142251, ITL. 0717378, JAP. 0539572.
3,502,582.—IMAGING SYSTEMS. MAR. 24, 1970. ARG. 0171952, BEL. 0726571, CAN. 0873934, FRA. 1569382, GRB. 1237095, ITL. 0835554, MEX. 0100704, VZL. 0032414.
3,740,334.—PROCESS OF PREPARING SOLID DEVELOPERS FOR ELECTROSTATIC LATENT IMAGES. JUNE 19, 1973.
3,830,750.—ENCPSLTNG SBSTNLY SLUBL PRTN OF CORE MATL IN SBSTNLY SLBLE SHELL MATL OF DFRNT SOLUBLTY. AUG. 20, 1974. AUS. 0466018, BEL. 0793246, CAN. 0983328, GRB. 1411954, ITL. 0973317, SPN. 0410224, STZ. 0028527.
3,936,517.—METHOD FOR REDUCING PARTICLE SIZE. FEB. 3, 1976.
4,016,099.—METHOD OF FORMING ENCAPSULATED TONER PARTICLES. APR. 5, 1977.
4,071,670.—METHOD OF SIZING MONOMER DROPLETS FOR SUSPENSION POLYMERIZATION TO FORM SMALL PARTICLES. JAN. 31, 1978. BEL. 857223.
4,077,804.—METHOD OF PRODUCING TONER PARTICLES BY IN-SITU POLYMERIZATION AND IMAGING PROCESS. MAR. 7, 1978.
4,097,620.—MAGNETIC TONER PARTICLE COATING PROCESS. JUNE 27, 1978.
4,142,981.—TONER COMBINATION FOR CARRIERLESS DEVELOPMENT. MAR. 6, 1979.
4,148,741.—POLYMERIZATION AND ATTRITION METHOD FOR PRODUCING TONER WITH REDUCED PROCESSING STEPS. APR. 10, 1979.
4,171,274.—ALTERATION OF TESSELATED MAGNETIC PARTICLES OF FRACTURE. OCT. 16, 1979.
4,192,902.—IN SITU COATING THEN SPRAY DRYING OF MAGNETIC TONER. MAR. 11, 1980.

Class 18D

3,150,446.—BRAZING METHOD AND COMPOSITION. SEPT. 29, 1964.
3,666,429.—MATALLIZED AND BRAZED CERAMICS. MAY 30, 1972.
3,959,934.—COMPOSITION AND METHOD FOR REPAIRING SELENIUM PHOTORECEPTOR. JUNE 1, 1976.
3,971,169.—A METHOD FOR REPAIRING SELENIUM PHOTOCONDUCTORS. JULY 27, 1976.
4,062,658.—COMPOSITION & METHOD FOR REPAIRING SELENIUM PHOTORECEPTORS. DEC. 13, 1977.

Class 18E

3,950,168.—FIXING POWDER IMAGES-FUSING AIDES FOR HYBRID FIX. APR. 13, 1976.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.

Class 20

3,916,167.—COUNTERS. OCT. 28, 1975.

Class 20A

3,751,693.—MOVING COIL MOTOR WITH NO SPRAY FLUX. AUG. 7, 1973. AUS. 3467604, BEL. 0795400, CAN. 0980395, GRB. 1424622, ITL. 0979062, SPN. 0411470.
3,769,467.—VIBRATION DAMPED TRANSDUCER HEAD ASSEMBLY. OCT. 30, 1973. ARG. 0195905, AUS. 0476996, BEL. 0795401, CAN. 0995355, GRB. 1417764, ITL. 0979063, MEX. 0135598, SPN. 0411538, STZ. 0558582, SWD. 7301915.
4,046,105.—LAMINAR DEEP WAVE GENERATOR. SEPT. 6, 1977.
4,076,417.—INTERLOCKING APPARATUS FOR AN OPTICAL SYSTEM AND REPRODUCING MACHINE. FEB. 28, 1978. HAT. 1604.

Class 20A 1

RE.27,313.—BELT TRACKING SYSTEM - RE OF 3,500,694-D2586. MAR. 21, 1972.
3,435,693.—BELT TRACKING DEVICE. APR. 1, 1969. ARG. 0168295, ATR. 0283116, AUS. 0421893, BEL. 0705641, CAN. 0853440, CHL. 0023084, CLB. 0017528, DNK. 0117047, FRA. 1543079, GRB. 1180659, ITL. 0827782, MEX. 0100320, NOR. 0124530, PRU. 0009336, SAF. 0676414, SPN. 0346430, STZ. 0471736, URG. 0009729, USR. 0321984, VZL. 0023676.
3,500,694.—BELT TRACKING SYSTEM — SEE D3286 FOR RE27313. MAR. 17, 1970.
3,592,071.—BELT TRACKING APPARATUS. JULY 13, 1971. ARG. 0179666, BEL. 0751117, CAN. 0925118, FRA. 7019040, GRB. 1298926, ITL. 0893540, JAP. 0770135, MEX. 0118981, SPN. 0380136.
3,593,838.—CONVEYOR BELT. JULY 20, 1971. CAN. 0883720.

Class 20A 2

3,498,148.—CHAIN TRAIN. MAR. 3, 1970.
3,509,780.—DOUBLE-ACTION ROTARY SOLENOID DRIVE MECHANISM. MAY 5, 1970.
3,844,179.—GEAR DRIVE FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. OCT. 29, 1974. ARG. 203483, BEL. 0816382, CAN. 1007075, GRB. 1467714, STZ. 5786990, VZL. 0033061.
3,982,831.—ELECTROSTATOGRAPHIC REPRODUCTION APP & DRIVE THEREFOR. SEPT. 28, 1976
3,985,277.—WEB HANDLING DEVICE. OCT. 12, 1976.
4,110,028.—DRIVE SYSTEM FOR MULTI-MODE REPRODUCING APPARATUS. AUG. 29, 1978. BEL. 844828.

Class 20A 3

3,405,564.—PULLEY. OCT. 15, 1968. CAN. 0850353.
3,505,716.—ROLL APPARATUS. APR. 14, 1970.
3,791,243.—METHOD AND APPARATUS FOR FORMING EDGES OF AN ENDLESS BELT. FEB. 12, 1974.
3,932,177.—COLLAR AND METHOD OF MAKING SAME. JAN. 13, 1976.

Class 20A 4

3,329,029.—OFF-CENTER LOAD MOVING ASSEMBLY. JULY 4, 1967.

3,337,072.—LOADER. AUG. 22, 1967. CAN. 0825092, GRB. 1166619, JAP. 0605648.
3,493,269.—LOADING HEAD. FEB. 3, 1970. CAN. 0864392.
3,777,578.—LINEAR ACTUATOR. DEC. 11, 1973. CAN. 9783901.

Class 20A 5

3,112,819.—CLUTCH MECHANISM - 914. DEC. 3, 1963. CAN. 0688810.
3,213,645.—TORQUE LIMITING MECHANISM. OCT. 26, 1965. CAN. 0729978, GRB. 1035547, JAP. 0548690.
3,623,680.—CLUTCH/BRAKE MECHANISM. NOV. 30, 1971.
3,686,974.—MECHANICAL DRIVE ARRANGEMENT. AUG. 29, 1972.

Class 20A 6

3,351,831.—MOTOR SPEED CONTROL UTILIZING LIGHT SENSITIVE CONDUCTIVE AND RESISTIVE ELEMENTS. NOV. 7, 1967.
3,388,875.—WEB TRANSPORT CONTROL ASSEMBLY. JUNE 18, 1968.
3,418,046.—SIGNAL STORAGE DEVICE. DEC. 24, 1968. CAN. 0852814, GER. 1524999, GRB. 1190084, JAP. 0589515.
3,552,221.—SPEED CONVERTING MECHANISM. JAN. 5, 1971.
3,858,777.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. JAN. 7, 1975.
3,870,934.—WEB TENSION CONTROLLER. MAR. 11, 1975.
3,909,125.—STEPPER MOTOR CONTROL. SEPT. 30, 1975.
3,917,400.—METHOD & APPARATUS FOR MAINTAINING A PREDETERMINED PHASE RELATIONSHIP BETWEEN TWO SIGNALS. NOV. 4, 1975.
3,921,043.—METHOD & APPARATUS FOR MAINTAINING SUBSTANTIALLY CONSTANT TORQUE IN A WEB TRANSPORT APPARATUS. NOV. 18, 1975.
3,944,896.—PHASE SYNCHRONIZATION SYSTEM WITH START-UP SEQUENCING AND AUTOMATIC SHUTDOWN. MAR. 16, 1976.
3,991,355.—STEPPER MOTOR CONTROL NOV. 9, 1976.
4,110,028.—DRIVE SYSTEM FOR MULTIMODE REPRODUCING APPARATUS. AUG. 29, 1978. BEL. 844828.

Class 20B

3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.
4,040,827.—DEVELOPMENT IMAGING METHODS. AUG. 9, 1977.

Class 20B 1

3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.
3,129,850.—POWDER CLOUD GENERATING APPARATUS. APR. 21, 1964. CAN. 0693933, GER. 1497044, GRB. 1001237, JAP. 0436042.

Class 20B 2

3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.
3,122,455.—XEROGRAPHIC TONER DISPENSER. FEB. 25, 1964.
3,356,248.—CONTAINER WITH A ROTATABLE CLOSURE. DEC. 5, 1967. CAN. 0825091, GRB. 1166618.
3,477,568.—ELECTROSTATIC SEPARATION OF ROUND AND NONROUND PARTICLES. NOV. 11, 1969.
3,478,600.—PARTICLE SIZE AND DISTRIBUTION ANALYZING APPARATUS. NOV. 18, 1969. CAN. 0871819, GRB. 1196449, JAP. 0667702.
3,694,068.—ROLLER RETRACTION MECHANISM IN A MULTIPLE ROLLER BELT ASSEMBLY. SEPT. 26, 1972. CAN. 0946322, GRB. 1370798.
3,698,540.—WEB SENSING MECHANISM FOR TRACKING SYSTEM. OCT. 17, 1972. CAN. 0946926.
3,702,131.—BELT TRACKING SYSTEM. NOV. 7, 1972. ARG. 1949380, AUS. 0459379, BEL. 0777321, CAN. 0953673, FRA. 7147892, GRB. 1381720, ITL. 0944435, MEX. 0126336, PNM. 0002633, SPN. 0398380.
3,740,288.—METHOD OF PREPARING A TONER DISPENSER. JUNE 19, 1973.
3,840,879.—EXCESS TONER SHIELD FOR ELECTROGRAPHIC APPARATUS. OCT. 8, 1974.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.

Class 20B 3

3,410,060.—XEROGRAPHIC FILTER APPARATUS. NOV. 12, 1968. CAN. 0810976, FRA. 1458648, GRB. 1114505, ITL. 0729638, JAP. 0724232.
3,570,224.—FILTER FOR ELECTROSTATOGRAPHIC DEVELOPER. MAR. 16, 1971.
3,662,884.—METHOD AND APPARATUS FOR ELECTROSTATICALLY CLASSIFYING TONER PARTICLES. MAY 16, 1972. CAN. 0956273, GRB. 1327942.
3,740,735.—AIR CIRCULATION APPARATUS. JUNE 19, 1973. CAN. 1014265, GRB. 1322612, JAP. 0840915.
3,909,383.—CLEANING PROCESS. SEPT. 30, 1975. CAN. 0905883.
3,544,458.—METHOD OF FILTERING. DEC. 1, 1970. BEL. 732578, CAN. 888335.

Class 20 C

3,698,540.—WEB SENSING MECHANISM FOR TRACKING SYSTEM. OCT. 17, 1972. CAN. 0946926.

Class 20C 1

3,498,500.—LEVEL SENSOR. MAR. 3, 1970. CAN. 0912851, GRB. 1251128, JAP. 0663856.
3,520,445.—DIELECTRIC LEVEL SENSOR. JULY 14, 1970. CAN. 0895527, GRB. 1239856, JAP. 0663857.

Class 20C 2

3,357,249.—TEMPERATURE SENSOR. DEC. 12, 1967. CAN. 0810332, GER. 1690654, GRB. 1171381.
3,723,980.—TEMPERATURE COMPENSATION SYSTEM FOR MAGNETIC DISK MEMORY UNIT. MAR. 27, 1973. ARG. 0195985, AUS. 0471633, BEL. 0791363, FRA. 7240560, GRB. 1408778, ITL. 0970913, MEX. 0129694, SPN. 0408629, STZ. 0028456, SWD. 7214693, VZL. 0032424.

Class 20C 3

3,492,732.—WEB QUANTITY INDICATOR. FEB. 3, 1970. CAN. 0887178.

Class 20C 4

3,191,440.—PRESSURE GAUGE INSTRUMENT. JUNE 29, 1965.
3,249,760.—PRESSURE GAUGE INSTRUMENT. MAY 3, 1966.
3,907,421.—TRANSFER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. SEPT. 23, 1975.
4,138,635.—ALTERNATING CURRENT GENERATOR USING LIGHT DEPENDENT RESISTOR. FEB. 6, 1979.

Class 20C 5

3,216,247.—WIND-MEASURING METER DEVICE. NOV. 9, 1965.

Class 20C 6

3,502,163.—EQUAL ARM BALANCE WITH C-SHAPED FULCRUM SLEEVE FORMED ON BEAM. MAR. 24, 1970.
3,583,505.—SPRING SCALE. JUNE 8, 1971. CAN. 0902123, GRB. 1295477.
3,878,358.—DIGITAL POWER CONTROL. APR. 15, 1975.

Class 20C 7

3,396,965.—SENSOR GAUGE. AUG. 13, 1968. CAN. 0822218, GRB. 1152538, JAP. 0587326.

Class 20D

3,746,502.—EVAPORATION CRUCIBLE. JULY 17, 1973. GRB. 1411236.
3,765,638.—SUCTION MOUNT. OCT. 16, 1973.
3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

Class 20D 1

3,379,855.—FLUID FEED SYSTEM. APR. 23, 1968.
3,407,018.—TWO-AXIS ANGULAR POSITIONING APPARATUS FOR ADJUSTING THE POSITION OF AN OPTICAL ELEMENT. OCT. 22, 1968.

3,436,071.—WORK HOLDER. APR. 1, 1969. CAN. 0856095, GRB. 1174795, JAP. 0642773.
3,440,859.—CORNER FORMING APPARATUS. APR. 29, 1969. CAN. 0866532.
3,475,936.—TRANSPORT SYSTEM. NOV. 4, 1969. GRB. 1179749.
3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,901,647.—LOW RADIATION OPEN-BOAT CRUCIBLES. AUG. 26, 1975.
4,016,470.—TRANSDUCER BORING SYSTEM. APR. 5, 1977.
4,018,414.—HOLDING FIXTURES. APR. 19, 1977.
4,143,960.—RETRACTABLE SUPPORT MEMBER. MAR. 13, 1979.

Class 20D 2

3,341,681.—XEROGRAPHIC PLATE FABRICATION. SEPT. 12, 1967. CAN. 0780598, FRA. 1415795, GRB. 1070555, HOL. 0144068, IND. 0094992, ITL. 0738063.
3,876,317.—LATCH MECHANISM. APR. 8, 1975. CAN. 1005486.

Class 20D 3

3,258,281.—HERMETIC SEALED COUPLING FOR CONDUITS. JUNE 28, 1966.
3,317,224.—FLANGED PIPE COUPLING HAVING METALLIC SEAL MEANS. MAY 2, 1967.
3,366,343.—DEVICE FOR FASTENING A SHAFT TO A REEL. JAN. 30, 1968.
3,604,737.—METHOD OF JOINING MATERIALS. SEPT. 14, 1971.

Class 20D 4

3,532,863.—DYNAMIC CAM TESTER. OCT. 6, 1970. CAN. 0835529.
3,843,233.—ALIGNING AGENT FOR LOWRNG THRSHLD VOLTG REQUIRD TO EFFECT OPTCLY NEQTV TO OPTCLY POSITIVE PHASE. OCT. 22, 1974.

Class 20D 5

3,596,316.—BLOW MOLDING APPARATUS. AUG. 3, 1971.

Class 20D 6

3,384,107.—BAKEABLE VACUUM VALVE. MAY 21, 1968.

Class 20D 7

3,489,463.—BRUSH SIZING APPARATUS. JAN. 13, 1970. GRB. 1243233, JAP. 0810578.

Class 20E

3,217,328.—ANTENNA WITH WIRE MESH REFLECTOR COLLAPSING IN A PINWHEEL MANNER. NOV. 9, 1965.

Class 20F

3,390,693.—PURE FLUID AMPLIFIER. JULY 2, 1968.
3,413,993.—FLUID DEVICE. DEC. 3, 1968.
3,417,770.—FLUID AMPLIFIER SYSTEM. DEC. 24, 1968.
3,459,205.—MAGNETICALLY CONTROLLED FLUID AMPLIFIER. AUG. 5, 1969.
3,496,955.—ELECTRICALLY ACTUATED BISTABLE FLUID AMPLIFIER. FEB. 24, 1970.
3,726,588.—WEB TRACKING SYSTEM. APR. 10, 1973.

Class 20 G

3,217,328.—ANTENNA WITH WIRE MESH REFLECTOR COLLAPSING IN A PINWHEEL MANNER. NOV. 9, 1965.
3,549,059.—TRIGGERING APPARATUS AND WORK LOCATING MEANS FOR AEROSOL SPRAY CANS. DEC. 22, 1970.
3,555,725.—SELF-TRAVELLING WHEEL. JAN. 19, 1971. CAN. 0900718, GRB. 1289331, JAP. 0713807.
3,688,415.—VIBRATION DEMONSTRATION. SEPT. 5, 1972.
3,747,589.—REACTION TIME TESTING APPARATUS. JULY 24, 1973.
3,818,391.—TRACKING ASSEMBLY FOR AN ENDLESS BELT ELECTROSTATOGRAPHIC MACHINE. JUNE 18, 1974. CAN. 1010107.
3,840,879.—EXCESS TONER SHIELD FOR ELECTROGRAPHIC APPARATUS. OCT. 8, 1974.
3,907,421.—TRANSFER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. SEPT. 23, 1975.
3,941,006.—FREE FLOATING BELT TENSIONER. MAR. 2, 1976.
3,946,920.—VACUUM SYSTEM CONTROL. MAR. 30, 1976.
3,982,753.—COMBINED BACKSTOP & BRAKE-COMBINED BACKSTOP & BRAKE FOR ALBERT. SEPT. 28, 1976. BEL. 0812180, CAN. 1004161, FRA. 7407806, GRB. 1443088.
3,994,053.—DRUM SUPPORT APPARATUS. NOV. 30, 1976.
4,040,157.—DRUM SUPPORT APPARATUS. AUG. 9, 1977.
4,040,678.—BEARING ASSEMBLY. AUG. 9, 1977.
4,105,345.—EXPANDABLE PHOTORECEPTOR END-BELLS. AUG. 8, 1978.
4,120,576.—DRUM SUPPORT APPARATUS. OCT. 17, 1978.
4,135,805.—COUNTERBALANCING APPARATUS. JAN. 23, 1979.
4,143,960.—RETRACTABLE SUPPORT MEMBER. MAR. 13, 1979.

Class 21

D.240,557.—TRAY RACK. JULY 13, 1976.
3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.
D245,667.—WIRE CUTTER. SEPT. 6, 1977.

Class 21A

3,905,400.—ELECTROFORMING MANDREL. SEPT. 16, 1975.
4,067,782.—METHOD OF FORMING AN ELECTROFORMING MANDREL. JAN. 10, 1978.

Class 21A 1

3,316,158.—FOAM METAL CONSTRUCTION AND A METHOD FOR MAKING IT. APR. 25, 1967.
3,378,469.—ELECTROFORMING TECHNIQUE AND STRUCTURE FOR REFLECTING MIRRORS. APR. 16, 1968.
3,428,533.—HIGH QUALITY SUB-MASTERS AND METHOD FOR PRODUCING THEM. FEB. 18, 1969.
3,472,679.—COATING SURFACES. OCT. 14, 1969. CAN. 0896992.
3,505,177.—ELECTROFORMING PROCESS. APR. 7, 1970.
3,520,780.—MAGNESIUM ELECTRODEPOSITION. JULY 14, 1970.
3,844,906.—DYNAMIC BATH CONTROL PROCESS. OCT. 29, 1974. BEL. 0799236, FRA. 7316539, GRB. 1421818.
3,853,614.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. DEC. 10, 1974. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.
3,876,510.—PROCESS FOR ELECTROFORMING A FLEXIBLE BELT. APR. 8, 1975.
3,905,685.—ZOOM LENS FOR FIXED CONJUGATES. SEPT. 16, 1975. CAN. 0995039, GRB. 1451781.
3,954,568.—ELECTROFORMING AN ENDLESS FLEXIBLE SEAMLESS XEROGRAPHIC BELT. MAY 4, 1976. ARG. 0185811, AUS. 0449005, BEL. 0762249. CAN. 0889781, EGR. 0094306, FRA. 7103844, GRB. 1288717, HUN. 0169866, ITL. 0918048, MEX. 0119465, PLD. 0081712, PNM. 0002384, SPN. 0387636, STZ. 0521612, SWD. 0360753, TIW. 0007843, VZL. 0027666.
3,959,109.—METHOD AND APPARATUS FOR ELECTROFORMING. MAY 25, 1976.
3,963,587.—PROCESS FOR ELECTROFORMING NICKEL FOILS. JUNE 15, 1976.
4,043,876.—METHOD AND APPARATUS FOR ELECTROFORMING. AUG. 23, 1977.

Class 21A 2

3,316,158.—FOAM METAL CONSTRUCTION AND A METHOD FOR MAKING IT. APR. 25, 1967.
3,378,469.—ELECTROFORMING TECHNIQUE AND STRUCTURE FOR REFLECTING MIRRORS. APR. 16, 1968.
3,428,533.—HIGH QUALITY SUB-MASTERS AND METHOD FOR PRODUCING THEM. FEB. 18, 1969.
3,577,323.—HIGH QUALITY SUBMASTERS. MAY 4, 1971.
3,927,463.—METHOD OF MAKING A CYLINDRICALLY SHAPED, HOLLOW ELECTROFORMING MANDREL. DEC. 23, 1975.
3,950,839.—ELECTROFORMING MANDREL. APR. 20, 1976.

Class 21A 3

3,352,482.—ION SPUTTER PUMPING COLLECTOR. NOV. 14, 1967.
3,437,568.—APPARATUS AND METHOD FOR DETERMINING AND CONTROLLING STRESS IN AN ELECTROFORMED PART. APR. 8, 1969.
3,799,859.—ELECTROFORMING SYSTEM. MAR. 26, 1974. GRB. 1427544.
4,043,876.—METHOD AND APPARATUS FOR ELECTROFORMING. AUG. 23, 1977.

Class 21B

3,223,878.—METHOD OF FABRICATING FINE GRIDS. DEC. 14, 1965.
3,276,919.—PROCESS FOR FORMING METAL STRUCTURES HAVING VERY FINE PORES. OCT. 4, 1966.
3,360,347.—PRODUCTION OF POUROUS MATERIALS. DEC. 26, 1967.
3,494,748.—OXIDATION RESISTANT COATING AND ARTICLE. FEB. 10, 1970.
3,666,429.—MATALLIZED AND BRAZED CERAMICS. MAY 30, 1972.
3,703,306.—METHOD OF HERMETICALLY SEALING SILICON TO A LOW EXPANSION ALLOY. NOV. 21, 1972.
3,740,830.—BRAZING CERAMICS. JUNE 26, 1973.
3,825,724.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER. JULY 23, 1974. CAN. 0995295, GRB. 1406047.
3,851,985.—COLLAR AND METHOD OF MAKING SAME. DEC. 3, 1974.
3,885,923.—GENERATION OF CURVED SURFACES ON A WORKPIECE. MAY 27, 1975.
3,911,163.—SOLDER COATING PROCESS AND APPARATUS. OCT. 7, 1975.
4,083,323.—PNEUMATIC SYSTEM FOR SOLDER LEVELING APPARATUS. APR. 11, 1978.
4,114,431.—METHOD OF FORMING TUBULAR METAL PRODUCTS. SEPT. 19, 1978.

Class 21C

3,653,885.—PROCESS OF STABILIZING A MIGRATION IMAGE COMPRISING SELENIUM PARTICLES. APR. 4, 1972. CAN. 0937437.
4,112,841.—RESILIENT LITHOGRAPHIC MASTERS FOR DIRECT PRINTING. SEPT. 12, 1978.
4,114,535.—RESILIENT LITHOGRAPHIC MASTERS FOR DIRECT PRINTING. SEPT. 19, 1978.
4,123,283.—SETTING ELECTRICAL LATENT IMAGES IN MIGRATION IMAGING ELEMENTS. OCT. 31, 1978. AUS. 482769. BEL. 813501. CAN. 1037546. FRA. 7412476. GRB. 1471385. ITL. 1009714. MEX. 136227.
4,135,926.—MIGRATION IMAGING PROCESS IN WHICH LATENT IMAGE IS SET. JAN. 23, 1979. AUS. 482769. BEL. 813501. CAN. 1037546. FRA. 7412476. GRB. 1471385. ITL. 1009714. MEX. 136227.
4,202,932.—MAGNETIC RECORDING MEDIUM. MAY 13, 1980.

Class 22

D244,280.—SORTER WITH BIN INDICATOR. MAY 10, 1977.
D247,243.—SORTER CONTROLLER. FEB. 14, 1978.
D.252,275.—SUBSTRATE CLAMP FOR A SLITTING APPARATUS. JULY 3, 1979.

Class 22A

3,473,388.—ISOKINETIC PARTICLE SAMPLER. OCT. 21, 1969. CAN. 0852475, GRB. 1194569.
3,478,600.—PARTICLE SIZE AND DISTRIBUTION ANALYZING APPARATUS. NOV. 18, 1969. CAN. 0871819, GRB. 1196449, JAP. 0667702.
3,544,458.—METHOD OF FILTERING. DEC. 1, 1970. CAN. 0888335.
3,940,997.—APPARATUS AND METHOD FOR MEASURING ANGLE OF REPOSE. MAR. 2, 1976.

Class 22B

3,938,993.—XEROGRAPHIC METHOD FOR MAKING A RESPONSIVE ANSWER SYSTEM. FEB. 17, 1976. CAN. 0858780, GRB. 1235941, JAP. 0688426.
3,972,715.—PARTICLE ORIENTATION IMAGING SYSTEM. AUG. 3, 1976.

Class 22B 1

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.
3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FIN. 0050908, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.
3,508,879.—ALIQUOTTING DEVICE. APR. 28, 1970. ATR. 0280666, AUS. 0429344, BEL. 0722722, CAN. 0883952, FRA. 1578475, GER. 1673343, GRB. 1218747, ITL. 0862567, LXB. 0057971, MEX. 0101480, NOR. 0131257, NZL. 0155346, SAF. 0069936, SPN. 0363624, STZ. 0494403, SWD. 0342699.
3,526,480.—AUTOMATED CHEMICAL ANALYZER. SEPT. 1, 1970. ARG. 0174584, AUS. 0452281, BEL. 0728248, CAN. 0950341, FRA. 1584397, GER. 1673340, GRB. 1218749, HOL. 1467250, ITL. 0865002, MEX. 0118203, PNM. 0001668, SPN. 0381340, STZ. 0501922, SWD. 0359925, VZL. 0025782.
3,582,283.—CHEMICAL PACKAGE. JUNE 1, 1971.

Class 22B 1A

3,477,821.—CHEMICAL PACKAGE. NOV. 11, 1969. ARG. 0169582, AUS. 0433117, BEL. 0725955, CAN. 0876261, FRA. 1596338, GER. 1816225, GRB. 1245780, HOL. 0141402, ITL. 0852626, JAP. 0805178, MEX. 0108467. PNM. 0001764, SPN. 0361841, STZ. 0531895, SWD. 0345742, VZL. 0023719.
3,477,822.—CHEMICAL PACKAGE. NOV. 11, 1969. ARG. 0169541, AUS. 0433116, BEL. 0725958, CAN. 0904725, FRA. 1596340, GRB. 1251680, HOL. 0141098, ITL. 0852625, JAP. 0802751, MEX. 0108998, PNM. 0001662, SPN. 0361844, STZ. 0530223, SWD. 0346384, VZL. 0023725.
3,480,398.—CHEMICAL PACKAGE. NOV. 25, 1969. ARG. 0169487, AUS. 0433114, BEL. 0725956, CAN. 0885006, FRA. 1596337, GER. 1816228, GRB. 1257336, HOL. 0141797, ITL. 0856875, JAP. 0805177, MEX. 0108468, PNM. 0001663, SPN. 0361842, STZ. 0530637, SWD. 0345012, VZL. 0023722.
3,480,399.—CHEMICAL PACKAGE. NOV. 25, 1969. ARG. 0169540, AUS. 0433115, BEL. 0725957, CAN. 0906891, FRA. 1596339, GER. 1816227, GRB. 1251679, HOL. 0141099, ITL. 0852624, JAP. 0802750. MEX. 0108997, PNM. 0001669, SPN. 0361843, STZ. 0526106, VZL. 0023720.
3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.
3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FIN. 0050908, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.
3,545,934.—CHEMICAL PACKAGE. DEC. 8, 1970. BEL. 0739751, CAN. 0887759. FRA. 6933737, GER. 1950067, GRB. 1257337, HOL. 150690, ITL. 0873750.
3,545,935.—DISPOSABLE REACTION CONTAINER FOR AN AUTOMATIC CHEMICAL ANALYZER. DEC. 8, 1970. ARG. 0179456, AUS. 0447958, BEL. 0741890, CAN. 0933494, FRA. 6939709, GER. 1957735, GRB. 1257338, HOL. 0145773, ITL. 0878322, MEX. 0113681, SPN. 0373794, STZ. 0500010, SWD. 0353399.
3,554,705.—CHEMICAL PACKAGE. JAN. 12, 1971.
3,582,283.—CHEMICAL PACKAGE. JUNE 1, 1971.
3,582,285.—CHEMICAL PACKAGE. JUNE 1, 1971.

Class 22B 1B

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573,

LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.

3,508,879.—ALIQUOTTING DEVICE. APR. 28, 1970. ATR. 0280666, AUS. 0429344, BEL. 0722722, CAN. 0883952, FRA. 1578475, GER. 1673343, GRB. 1218747, ITL. 0862567, LXB. 0057971, MEX. 0101480, NOR. 0131257, NZL. 0155346, SAF. 0069936, SPN. 0363624, STZ. 0494403, SWD. 0342699.

3,526,480.—AUTOMATED CHEMICAL ANALYZER. SEPT. 1, 1970. ARG. 0174584, AUS. 0452281, BEL. 0728248, CAN. 0950341, FRA. 1584397, GER. 1673340, GRB. 1218749, HOL. 1467250, ITL. 0865002, MEX. 0118203, PNM. 0001668, SPN. 0381340, STZ. 0501922, SWD. 0359925, VZL. 0025782.

3,586,446.—FLAME PHOTOMETER. JUNE 22, 1971. ARG. 0183956, BEL. 0720577, CAN. 0876239, FRA. 1581844, GER. 1798234, GRB. 1246633, ITL. 0864506, JAP. 0835088, MEX. 0103300, SWD. 0342326, VZL. 0023659.

Class 22B 2

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336. ATR. 0302052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.

3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FIN. 0050908, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.

3,520,659.—METHOD AND APPARATUS FOR USE IN DETERMINING PROTHROMBIN TIME OF A BLOOD SAMPLE. JULY 14, 1970. ARG. 0176972, AUS. 0421560, BEL. 0722360, CAN. 0892696, FRA. 1588701, GER. 1804292, GRB. 1244355, HOL. 0142783, ITL. 0862597, MEX. 0105611, SPN. 0359312, SWD. 0345744, VZL. 0023706.

3,705,013.—ANALYTICAL PROCEDURES AND COMPOSITIONS THEREFOR. DEC. 5, 1972.

Class 24

D.249,695.—REMOVABLE UNDERSIZE SHEET EDGE GUIDE SHEET FEED CASSETTE. SEPT. 26, 1978.

3,888,892.—LIQUID CRYSTALLINE COMPOUNDS. JUNE 10, 1975.

4,126,711.—CHARGE PATTERN DEVELOPMENT METHOD & APPARATUS. NOV. 21, 1978. GRB. 1484712.

Class 24A 1

3,289,211.—ELECTRICAL RECORDING PEN. NOV. 29, 1966. ARG. 0144972, AUS. 0283737, BEL. 0663614, CAN. 0755964. FRA. 1444045, GER. 1498264, GRB. 1064344, HOL. 0145955, ITL. 0760432, JAP. 0704598, MEX. 0084384, NOR. 0121120, NZL. 0141445, SPN. 0312594, STZ. 0430241, SWD. 0336857, VZL. 0017268.

3,308,475.—ELECTROVISCOUSLY CONTROLLED RECORDER. MAR. 7, 1967.

3,359,566.—MOTOR ACTION CAPILLARY. DEC. 19, 1967. CAN. 0831673, GER. 1537562, GRB. 1196932, JAP. 0583415.

3,375,528.—RECORDING PEN HAVING A PLURALITY OF CLOSELY SPACED WIRES. MAR. 26, 1968. AUS. 0284067, BEL. 0680693, CAN. 0834975, FRA. 0089948, GER. 1548876, GRB. 1148771, HOL. 0150907, ITL. 0809504, JAP. 0773176, MEX. 0091261, SPN. 0326324, STZ. 0457888, SWD. 0325719.

3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.

3,512,173.—ALPHANUMERIC INK DROPLET RECORDER. MAY 12, 1970. ARG. 0180676, BEL. 0725960, CAN. 0879917, FRA. 1603645, GER. 1816194, GRB. 1227600, ITL. 0849703, JAP. 0770832, MEX. 0109982.

3,512,177.—INK RECORDING SYSTEM. MAY 12, 1970.

3,848,258.—MULTI-JET INK PRINTER. NOV. 12, 1974. BEL. 0819105, CAN. 1000778, FRA. 7419592.

3,893,131.—INK PRINTER. JULY 1, 1975. BEL. 0819105, CAN. 1000778, FRA. 7419592.

4,014,693.—ELECTROVISCOUS RECORDING. MAR. 29, 1977.

Class 24A 2

3,329,964.—FACSIMILE RECORDING APPARATUS. JULY 4, 1967. CAN. 0809338, GRB. 1095098.

3,334,354.—DOTTING INK RECORDER. AUG. 1, 1967. CAN. 0792422.

3,627,908.—HIGH-SPEED COLOR CORRECTING SCANNER FOR MAKING COLOR PRINTING PLATES. DEC. 14, 1971. CAN. 0923428, GRB. 1335980, JAP. 0774708.

4,024,544.—MENISCUS DAMPENING DROP GENERATOR. MAY 17, 1977.

4,032,929.—HIGH DENSITY LINEAR ARRAY INK JET ASSSEMBLY. JUNE 28, 1977.

4,057,807.—SEPARABLE LIQUID DROPLET INSTRUMENT AND MAGNETIC DRIVER THEREFOR. NOV. 8, 1977.

4,104,645.—COINCIDENCE INK JET. AUG. 1, 1978. SAF. 6469.

4,112,433.—MENISCUS DAMPENING DROP GENERATOR. SEPT. 5, 1978. STZ. 609915.

4,115,789.—SEPARABLE LIQUID DROPLET INSTRUMENT AND PIEZOELECTRIC DRIVERS THEREFOR. SEPT 19, 1978. BEL. 850334.

4,121,227.—INK JET ARRAY WITH ISOLATED FLUID RECTIFIER LAYERS. OCT. 17, 1978.

4,199,769.—COINCIDENCE GATE INK JET WITH INCREASED OPERATING PRESSURE WINDOW. APR. 22. 1980.

4,199,770.—COINCIDENCE GATE INK JET WITH INCREASED OPERATING PRESSURE WINDOW. APR. 22, 1980.

4,201,995.—COINCIDENCE GATE INK JET WITH INCREASED OPERATING PRESSURE WINDOW. MAY 6, 1980.

Class 24A 3

3,287,734.—MAGNETIC INK RECORDING. NOV. 22, 1966. CAN. 0808834, FRA. 1490442, GRB. 1102505, HOL. 0150643, ITL. 0784569, JAP. 0571140.

3,334,000.—METHOD FOR SIMULTANEOUS PRODUCTION OF A PLURALITY OF MICROCIRCUIT WAFERS. AUG. 1, 1967.

Class 24A 4

3,480,962.—FACSIMILE RECORDING SYS. NOV. 25, 1969.

3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.

3,484,793.—IMAGE RECORDING APPARATUS INK DROPLET RECORDER WITH OPTICAL INPUT. DEC. 16, 1969.

3,553,708.—APPARATUS AND METHOD EMPLOYING PHOTOELECTROVISCOUS INK. JAN. 5, 1971.

Class 24B

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

4,080,054.—DEVICE FOR REPLENISHING TONER PARTICLES. MAR. 21, 1978.

4,096,294.—PROCESS FOR PREPARING WATERLESS PRINTING MASTERS COMPRISING COPOLYMER OF SILOXANE AND CRYST. JUNE 20, 1978.

Class 24B 1

3,833,293.—METHOD OF CREATING COLOR TRANSPARENCIES. SEPT. 3, 1974.

4,047,947.—PROCESS FOR THE PREPARATION OF TRANSPARENCIES BY SELECTIVE DECOMPOSITION OF AN ORGANOSELENI. SEPT. 13, 1978.

4,055,424.—NOVEL MICROFILM AND PROCESS FOR PREPARATION. OCT. 25, 1977.

Class 24B 1B 1

3,528,355.—CAMERA-PROCESSOR. SEPT. 15, 1970. ARG. 0184627, ATR. 0303513, AUS. 0426557, BEL. 0720022, BRA. 6800654, CAN. 0864811, CHL. 0024251, CLB. 0018453, FRA. 1586179, GER. 1797177, GRB. 1244641, IND. 0117458. ITL. 0839895, LXB. 0056774, MEX. 0103737, NOR. 0128296, NZL. 0153587, PLP. 0006313, PNM. 0001980, PRU. 0010212, PTG. 0050229, SPN. 0357651, STZ. 0516171, SWD. 0338503, URG. 0009309, VZL. 0023698.

Class 24B 1B 3

3,459,888.—SELECTIVE PHOTOCOPIER. AUG. 5, 1969.

3,537,788.—AUTOMATIC DISCRIMINATION TECHNIQUE FOR SELECTIVE PHOTOCOPYING. NOV. 3, 1970.

Class 24B 1C

3,393,362.—PROCESS FOR DETECTING IRREGULARITIES IN A METALLIC SURFACE. JULY 16, 1968.
3,480,965.—APPARATUS FOR PYROGENICALLY RECORDING ON TRANSPARENCIES. NOV. 25, 1969.

Class 24B 1D

3,435,243.—FILM FRAME DETECTION SYSTEM. MAR. 25, 1969.

Class 24B 2A

3,349,980.—VACUUM TRANSPORT DEVICE. OCT. 31, 1967.
3,388,875.—WEB TRANSPORT CONTROL ASSEMBLY. JUNE 18, 1968.

Class 24B 2B

3,409,364.—GATE ASSEMBLY. NOV. 5, 1968.
3,409,365.—CONTACT PRINTER. NOV. 5, 1968. AUS. 0425973, JAP. 0613746.

Class 24B 2C

3,379,110.—EXPOSURE CONTROL SYSTEM. APR. 23, 1968.
3,479,119.—EXPOSURE CONTROL APPARATUS. NOV. 18, 1969.

Class 24B 4

3,510,216.—PROJECTION APPARATUS. MAY 5, 1970.

Class 24C

4,007,682.—REVERSE ANGLE MOUNTED INK-SPLITTING DOCTOR BLADE. FEB. 15, 1977.

Class 24C 1

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.

Class 24C 1A

3,170,395.—DUPLICATING. FEB. 23, 1965. AUS. 0410880, CAN. 0768079, FRA. 1414985, GRB. 1059659, ITL. 0740682, JAP. 0511405.
3,332,347.—DUPLICATING. JULY 25, 1967. AUS. 0271226, CAN. 0761868, FRA. 1367474, GER. 1471696, GRB. 1029997, ITL. 0730203.
3,357,353.—VAPOR THERMOGRAPHY RECORDING PROCESS AND RECORDING MEMBER USED THEREIN. DEC. 12, 1967.

Class 24C 1B

3,336,867.—DUPLICATING PROCESS. AUG. 22, 1967. CAN. 0796971, GRB. 1149056.

Class 24C 1C

3,487,775.—IMAGING SYSTEM. JAN. 6, 1970. CAN. 0873983.

Class 24C 1D

3,408,216.—IMAGE REPRODUCTION. OCT. 29, 1968. CAN. 0806942, GRB. 1127218, JAP. 0742511.
3,792,266.—THERMOGRAPHIC RECORDING USING VAPORIZED MATERIAL AND COLORED PARTICLE DEVELOPMENT. FEB. 12, 1974.

Class 24C 1E 1

3,402,660.—DRUM SUPPORT AND DRIVE SYSTEM FOR REPRODUCTION MACHINES. SEPT. 24, 1968.
3,427,965.—SHEET GRIPPER MEANS FOR REPRODUCTION MACHINE OF THE PRESSURE TRANSFER TYPE. FEB. 18, 1969.
3,429,259.—PRESSURE TRANSFER REPRODUCTION MACHINE. FEB. 25, 1969.
3,460,472.—TRANSFER SHEET CLAMPING MECHANISM FOR A REPRODUCTION MACHINE. AUG. 12, 1969.

Class 24C 1E 2

3,433,154.—PRESSURE PRODUCING MEANS FOR REPRODUCTION MACHINE. MAR. 18, 1969.

Class 24C 1E 3

3,374,732.—SELF-ALIGNING COPY DRUM STRIPOUT MECHANISM FOR REPRODUCTION MACH. MAR. 26, 1968.
3,375,780.—SHEET COUNTING MECHANISM FOR REPRODUCTION MACHINES. APR. 2, 1968.
3,380,379.—SHEET GUIDING MECHANISM FOR A REPRODUCTION MACHINE. APR. 30, 1968.
3,405,635.—PAPER SUPPORT TRAY FOR REPRODUCTION MACHINES. OCT. 15, 1968.
3,427,966.—PRESSURE TRANSFER TYPE REPRODUCTION MACHINE. FEB. 18, 1969.
3,430,558.—SHEET COUNTING SYSTEM IN A REPRODUCTION MACHINE. MAR. 4, 1969.

Class 24C 1E 4

3,375,779.—PROGRAMMING CONTROL FOR REPRODUCTION MACHINES. APR. 2, 1968.

Class 24C 1E 5

3,548,748.—DUPLICATING METHOD EMPLOYING SIMULTANEOUS APPLICATION OF ELECTRIC FIELD AND EXPOSURE TO RADIATION. DEC. 22, 1970. CAN. 0882051, GRB. 1227394, JAP. 0752522.
3,565,612.—DUPLICATING MASTERS BY THE MANIFOLD PROCESS. FEB. 23, 1971. ARG. 0193797, AUS. 0411612, BEL. 0708974, CAN. 0873277, FRA. 1549964, GER. 1671590, GRB. 1215956, ITL. 0823464, MEX. 0106608, VZL. 0023681.
3,681,065.—DYE TRANSFER COLOR PHOTOGRAPHY. AUG. 1, 1972.

Class 24C 1E 6

3,527,163.—SILK SCREEN MASTER. SEPT. 8, 1970.
4,199,359.—PHOTOGRAPHIC SCREEN STENCIL PRINTING PROCESS. APR. 22, 1980.

Class 24C 1E 7

3,357,354.—REPRODUCTION METHOD. DEC. 12, 1967.
3,406,137.—IMAGING MATERIAL. OCT. 15, 1968. AUS. 0409415, BEL. 0680375, CAN. 0815085, FRA. 1477912, GER. 1571874, GRB. 1149055, ITL. 0766799, JAP. 0594685, MEX. 0090845, SWD. 0336860.
3,415,186.—DUPLICATING SYSTEM. DEC. 10, 1968.
3,436,234.—DUPLICATING INK. APR. 1, 1969. AUS. 0408998, BEL. 0680377, CAN. 0806568, FRA. 1477914, GER. 1571875, GRB. 1151495, ITL. 0765635, JAP. 0594687, MEX. 0090362, SWD. 0336421.
3,446,646.—PRESSURE SENSITIVE RECEIVING AND TRANSFER SHEET. MAY 27, 1969. AUS. 0417562, BEL. 0680376, CAN. 0865673, FRA. 1477913, GER. 1571922, GRB. 0115076, ITL. 0765634, JAP. 0575982, MEX. 0090589, SWD. 0333578.

Class 24D

3,275,436.—METHOD OF IMAGE REPRODUCTION UTILIZING A UNIFORM RELEASABLE SURFACE FILM. SEPT. 27, 1966. AUS. 0296158, CAN. 0811877, FRA. 1371894, GRB. 1033523, ITL. 0702168, JAP. 0508402.
3,422,759.—LITHOGRAPHIC IMAGING SYSTEM USING PHOTOCHROMIC AND THERMOCHROMIC MATERIALS. JAN. 21, 1969. CAN. 0855648, GRB. 1190102.
3,460,476.—IMAGING PROCESS. AUG. 12, 1969. ARG. 0164839, AUS. 0418783, BEL. 0691755, CAN. 0882050, FRA. 1511173, GRB. 1168268, ITL. 0787662, JAP. 0562388, MEX. 0108240, SPN. 0346128, STZ. 0480672, SWD. 0331794. VZL. 0024009.
3,547,627.—LITHOGRPHC PRINTG MASTER AND METHOD EMPLOYING A CRYSTALLINE PHOTOCONDUCTIVE IMAGING LAYER. DEC. 15, 1970.
3,554,125.—METHOD OF MAKING A LITHOGRAPHIC MASTER AND METHOD OF PRINTING THEREWITH. JAN. 12, 1971. CAN. 0882052, GER. 1772302, GRB. 1219849.
3,718,087.—APPARATUS FOR APPLYING INK AND IMMISSIBLE FLUID TO A PRINTING SURFACE. FEB. 27, 1973. ARG. 0185945, AUS. 0449639, BEL. 0759110, CAN. 0919007, FRA. 7042608, GRB. 1330183, ITL. 0912865, MEX. 0120782.
3,878,168.—SILICONE ELASTOMERS. APR. 15, 1975.
3,901,151.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. AUG. 26, 1975.
3,907,562.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. SEPT. 23, 1975.

3,909,256.—ELECTROSTATOGRAPHIC PROCESS FOR PREPARING SCREEN PRINTING MEMBER. SEPT. 30, 1975.
3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975. GRB. 1461872.
3,948,655.—ELECTROSTATOGRAPHIC PROCESS FOR PREPARING GRAVURE PRINTING MEMBER. APR. 5, 1976.
3,951,060.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. APR. 20, 1976.
3,951,063.—PROCESS FOR PREPARING REVERSIBLE CURE WATERLESS LITHOGRAPHIC MASTERS. APR. 20, 1976.
3,957,349.—IMAGING METHOD. MAY 18, 1976.
3,961,947.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. JUNE 8, 1976.
3,968,278.—IMAGING METHOD. JULY 6, 1976.
3,971,316.—PROCESS FOR SMOOTHING WATERLESS LITHOGRAPHIC MASTERS. JULY 27, 1976.
3,995,554.—PROCESS FOR PREPARING RESILIENT IMAGED PRINTINGS MASTERS. DEC. 7, 1976.
3,999,481.—METHOD OF MAKING A MASTER. DEC. 28, 1976.
4,003,312.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC PRINTING MASTERS BY INK JET PRINTING MEANS. JAN. 18, 1977.
4,005,654.—PROCESS FOR SHALLOW RELIEF PRINTING. FEB. 1, 1977. BEL. 0792620, FRA. 7244602, GRB. 1416158, ITL. 0971749.
4,007,041.—ELECTROPHOTOGRAPHIC PRINTING METHOD. FEB. 8, 1977.
4,009,032.—PROCESS FOR PREPARING WATERLESS PRINTING MASTERS COMPRISING COPOLYMER OF SILOXANE AND THERMOPLA. FEB. 22, 1977.
4,009,660.—INKING IN LITHO PRINTING THROUGH A NON-IMAGED SCREEN. MAR. 1, 1977.
4,010,687.—PLANOGRAPHIC PRINTING MASTER-MULTI PHASE TONERS & MULTI PHASE ADHESIVE LAYERS. MAR. 8, 1977. BEL. 0813293, CAN. 0988364, GRB. 1458725, ITL. 1006438, PTG. 61726.
4,012,254.—NOVEL PHOTOCONDUCTIVE WATERLESS LITHOGRAPHIC PRINTING MASTERS & PROCESS OF PREPARATION. MAR. 15, 1977.
4,016,814.—PLANOGRAPHIC PRINTING MASTER — SPONGY IMAGE PATTERNS. APR. 12, 1977. CAN. 0985952, ITL. 1006441.
4,019,437.—PLANOGRAPHIC PRINTING MASTER TONER INDUCED POROUS SPONGE IMAGES TIPSI. APR. 26, 1977. BEL. 0813159, CAN. 1014416, GRB. 1458723, ITL. 1006440, NZL. 0173942.
4,030,416.—WATERLESS PRINTING MASTER. JUNE 21, 1977.
4,064,312.—NONIMAGED WATERLESS LITHOGRAPHIC MASTER WITH CURABLE SILICONE ELASTOMER AND A CURED INK REL. DEC. 20, 1977.
4,077,324.—METHOD OF FOUNTAINLESS LITHOGRAPHY. MAR. 7, 1978. FRA. 7520962.
4,077,325.—PROCESS FOR PREPARING WATERLESS PRINTING MASTERS. MAR. 7, 1978.
4,078,927.—PHOTOCONDUCTIVE PRINTING MASTER. MAR. 14, 1978.
4,080,897.—SELECTIVE TACK IMAGING AND PRINTING. MAR. 28, 1978.
4,081,572.—PREPARATION OF HYDROPHILIC LITHOGRAPHIC PRINTING MASTERS. MAR. 28, 1978.
4,077,073.—PROCESS FOR PREPARING INK RELEASING STENCIL. MAY 9, 1978.
4,097,138.—PHOTOCONDUCTIVE BELT INCREMENTING APPARATUS. JUNE 27, 1978.
4,100,135.—NOVEL ELASTOMERS AND IMPROVED WATERLESS LITHOGRAPHIC PRINTING MASTERS. JULY 11, 1978.
4,103,616.—ELASTOMERS AND IMPROVED WATERLESS LITHOGRAPHIC PRINTING MASTERS. AUG. 1, 1978.

Class 24E

3,315,602.—FORMING OF PRINTING PLATES. APR. 25, 1967. CAN. 0852683, GER. 1267227, GRB. 1132071, JAP. 0532965.
3,443,517.—ELECTROSTATIC DUPLICATION SYSTEM EMPLOYING RELIEF PRINTING PLATE. MAY 13, 1969. CAN. 0873982, GRB. 1212370, JAP. 0641477.
3,456,586.—PROCESS FOR MAKING AND USING A RELIEF PRINTING MASTER. JULY 22, 1969.
3,589,290.—RELIEF IMAGING PLATES MADE BY REPETITIVE XEROGRAPHIC PROCESSES. JUNE 29, 1971. CAN. 0896949.
3,957,348.—METHOD FOR ALTERING ELLIPTICALLY POLARIZED LIGHT. MAY 18, 1976.
3,964,907.—METHOD FOR THE PREPARATION OF RELIEF PRINTING MASTERS. JUNE 22, 1976.
4,017,581.—PROCESS FOR PREPARING PRINTING MASTERS & MOLDS. APR. 12, 1977.

Class 24F

3,445,226.—FROST GRAVURE PRINT MASTER. MAY 20, 1969. CAN. 0842443, FRA. 1480896, GRB. 1136029, ITL. 0771305, JAP. 0605647, MEX. 0093298.
3,559,570.—METHOD OF PREPARING AND USING A GRAVURE PRINTING PLATE. FEB. 2, 1971. CAN. 0844544, GRB. 1198142.
3,561,358.—GRAVURE IMAGING SYSTEM. FEB. 9, 1971. CAN. 0908257, GRB. 1201819, JAP. 0594737.
3,638,567.—METHOD OF PREPARING AND UTILIZING A GRAVURE PRINTING MASTER. FEB. 1, 1972.
3,801,315.—GRAVURE IMAGING SYSTEM. APR. 2, 1974. CAN. 0991245, GRB. 1411237.
3,918,400.—BLADE MOUNTING ASSEMBLIES. NOV. 11, 1975. BEL. 0816534, FRA. 7421752, GRB. 1419417.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.
4,024,838.—DEVELOPER LIQUID SUPPLY DEVICE. MAY 24, 1977.

Class 24G

3,565,978.—REPLICATION OF SURFACE DEFORMATION IMAGES. FEB. 23, 1971. AUS. 0417038, BEL. 0710829, CAN. 0879916, FRA. 1583418, GER. 1621783, GRB. 1221342, ITL. 0863054, MEX. 0096672.
3,592,114.—APPARATUS FOR JUSTIFYING A REPRODUCED LINE OF CHARACTERS. JULY 13, 1971.
3,678,850.—POROUS PRINTING PLATE PREPARED FROM PARTICULATE PHOTOSENSITIVE RESINOUS MATERIAL. JULY 25, 1972. CAN. 0844327, GRB. 1188376, JAP. 0635879.
4,059,554.—STABILIZE EMULSION INKS. NOV. 22, 1977.
4,068,588.—PRINTING USING AN ELECTROCHROMIC IMAGE. JAN. 17, 1978.
4,093,371.—COMPOSING MACHINE. JUNE 6, 1978.

Class 25

3,692,659.—ELECTROLYTIC REVERSIBLE COLOR DISPLAY DEVICE. SEPT. 19, 1972. CAN. 0932427, GRB. 1356187.
4,056,822.—LOW PROFILE SINGLE CHANNEL THERMAL ANALOG RECORDER. NOV. 1, 1977.
4,056,823.—ANALOG CHART RECORDER EMPLOYING THERMAL PRINTING MEANS. NOV. 1, 1977.
4,099,071.—MONOLITHIC ELECTRONIC SCANNING DEVICE. JULY 4, 1978.
4,104, 515.—CONSUMABLE CREDIT CARD. AUG. 1, 1978.
4,118,112.—METHOD FOR REDUCING POWER DISSIPATION IN TAPERED RESISTOR DEVICES. OCT. 3, 1978.
4,121,153.—TAPERED RESISTOR METER. OCT. 17, 1978.
4,126,824.—PROGRESSIVELY SHORTED TAPERED RESISTANCE DEVICE. NOV. 21, 1978.

Class 25A

3,692,404.—STRIPPABLE LAYER RELIEF PRINTING. SEPT. 19, 1972.
3,900,817.—SPHERICAL POTENTIOMETER WITH BALL CONTACT MEANS. AUG. 19, 1975.
3,990,072.—ACOUSTIC RESIDUE ALGEBRA DECORDER. NOV. 2, 1976.

Class 25A 1

3,207,127.—APPARATUS FOR FORMING COATINGS ON PRINTED CIRCUIT BOARDS. SEPT. 21, 1965. CAN. 0733463, FRA. 1374360, GER. 1490985, GRB. 1053284, ITL. 0696974.
3,217,209.—PRINTED CIRCUITS WITH RESISTIVE AND CAPACITIVE ELEMENTS. NOV. 9, 1965. CAN. 0782178, FRA. 1300771, GER. 1202853, GRB. 0978571, ITL. 0647493, JAP. 0430795.
3,219,509.—AN APPARATUS FOR AUTOMATIC FABRICATION OF MICROCIRCUITRY. NOV. 23, 1965. CAN. 0785448, GRB. 1031288, JAP. 0477810.
3,288,639.—METHOD FOR MAKING A PLURAL LAYERED PRINTED CIRCUIT BOARD. NOV. 29, 1966.
3,485,934.—CIRCUIT BOARD. DEC. 23, 1969.
3,893,409.—APPARATUS FOR SOLDER COATING PRINTED CIRCUIT. JULY 8, 1975.
3,990,024.—MICROSTRIP STRIPLINE IMPEDANCE TRANSFORMER. NOV. 2, 1976.

4,018,414.—HOLDING FIXTURES. APR. 19, 1977.
4,024,631.—PRINTED CIRCUIT BOARD PLATING PROCESS. MAY 24, 1977.
4,029,373.—MEANS FOR WIRING INTO A SEALED ENCLOSURE. JUNE 14, 1977. CAN. 0995367, GRB. 1444032.
3,134,930.—MICROMINIATURE CIRCUITRY. MAY 26, 1964.
4,046,105.—LAMINAR DEEP WAVE GENERATOR. SEPT. 6, 1977.
4,048,718.—PIN CRIMPING APPARATUS AND PRODUCT THEREFROM. SEPT. 20, 1977.
4,083,323.—PNEUMATIC SYSTEM FOR SOLDER LEVELING APPARATUS. APR. 11, 1978.
4,125,136.—CUT AND CLINCH MECHANISM. NOV. 14, 1978.
4,179,797.—METHOD OF MAKING A RESISTOR ARRAY. DEC. 25 1979.

Class 25A 2

3,134,930.—MICROMINIATURE CIRCUITRY. MAY 26, 1964.
3,164,750.—ELECTRONIC PACKAGING APPARATUS. JAN. 5, 1965.
3,445,926.—PRODUCTION OF SEMICONDUCTOR DEVICES BY USE OF ION BEAM IMPLANTATION. MAY 27, 1969.
3,906,537.—SOLID STE ELMNT CMPRSNG SMICNDCTVE GLS CMPSTN EXHBING NGTVE INCRMNTL RSISTNCE AND TRSHLD SWTCHNG. SEPT. 16, 1975. BEL. 0820772, CAN. 1005929.
3,956,042.—SELECTIVE ETCHANTS FOR THIN FILM DEVICES. MAY 11, 1976.
4,181,913.—RESITIVE ELECTRODE AMORPHOUS SEMICONDUCTOR NEGATIVE RESISTANCE DEVICE. JAN. 1, 1980.
4,215,354.—SUPPRESSION OF CROSS-COUPLING IN MULTI-ORIFICE PRESSURE PULSE DROP-EJECTOR SYSTEMS. JULY 29, 1980.

Class 25A 3

3,244,556.—ABRASION FOR THIN FILM RESISTANCE CONTROL. APR. 5, 1966. CAN. 0788954, FRA. 1385420, GER. 1490986, GRB. 1054076, ITL. 0705899, JAP. 0453904.
3,274,372.—SOLID VAPORIZATION. SEPT. 20, 1966.
3,287,161.—METHOD FOR FORMING A THIN FILM RESISTOR. NOV. 22, 1966. CAN. 0819895, ITL. 0705900, JAP. 0499787.
3,352,731.—THIN FILM PRINTED CIRCUIT. NOV. 14, 1967. AUS. 0296168, CAN. 0790796, FRA. 1419084, GER. 1490987, GRB. 1077686, ITL. 0739442, JAP. 0537661.
3,413,716.—THIN FILM INDUCTOR ELEMENTS. DEC. 3, 1968. CAN. 0841245, FRA. 1476476, GRB. 1149759.
3,832,766.—APPARATUS FOR ASSEMBLING A PLATED WIRE MEMORY PLANE. SEPT. 3, 1974. CAN. 0942420, GRB. 1376654.

Class 25A 4

3,317,656.—ELECTRICAL CONNECTION FOR SHEATHED CONDUCTORS. MAY 2, 1967.
3,603,357.—BACKWIRING. SEPT. 7, 1971.
3,644,659.—CABLE CONSTRUCTION. FEB. 22, 1972.
3,792,227.—FUSER APPARATUS. FEB. 12, 1974.
3,847,479.—COVER FOR WIRE WRAPPED CARD CHASSIS. NOV. 12, 1974.
3,861,775.—MULTIPLE CIRCUIT BOARD CONNECTOR. JAN. 21, 1975. GRB. 1419580.
3,869,696.—FUSER APPARATUS. MAR. 4, 1975.
3,903,937.—BACK WIRING. SEPT. 9, 1975.
4,045,750.—ELECTRICAL CABLE AND COUPLING ARRANGEMENT. AUG. 30, 1977. FRA. 7631197.

Class 25B

3,688,127.—DIGITAL CIRCUIT LOGIC. AUG. 29, 1972.
3,937,986.—LINEAR WAVEFORM GENERATOR. FEB. 10, 1976.
3,975,755.—STABLE NON-CRYSTALLINE MATERIAL FOR SWITCHING DEVICES. AUG. 17, 1976.
4,095,020.—PROCESS FOR CONTROLLED PHASE TRANSFORMATION OF ALPHA PHASE OF POLY (VINYLIDENE FLUORIDE) TO. JUNE 13, 1978.

Class 25B 1

3,384,792.—STACKED ELECTRODE FIELD EFFECT TRIODE. MAY 21, 1968.
3,584,268.—INVERTED SPACE CHARGE LIMITED TRIODE. JUNE 8, 1971.
3,599,321.—INVERTED SPACE CHARGE LIMITED TRIODE. AUG. 17, 1971.

Class 25B 2

3,510,735.—HIGH SPEED SEMICONDUCTOR. MAY 5, 1970.
3,673,572.—ELECTROLUMINESCENT DEVICE. JUNE 27, 1972. CAN. 0919286.
3,697,163.—PLUG-IN VACUUM AND CIRCUIT SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. OCT. 10, 1972. CAN. 0941883.

Class 25B 3

3,551,727.—THERMIONIC CONVERTER HAVING A LOW FUNCTION COLLECTOR ELECTRODE. DEC. 29, 1970.
3,928,812.—PROGRAMMABLE BIT CLOCK OSCILLATOR FOR CONTROLLING THE PROCESSING OF BINARY DIGITS. DEC. 23, 1975. CAN. 0997434.

Class 25B 4

3,579,031.—ZERO ARC DROP THYRATRON. MAY 18, 1971.

Class 25C

3,911,420.—DISPLAY SYSTEM INCLUDING A HIGH-RESOLUTION CHARACTER GENERATOR. OCT. 7, 1975.
3,937,937.—PRIMARY POWER FAULT DETECTOR. FEB. 10, 1976. CAN. 1011818.
4,045,750.—ELECTRICAL CABLE AND COUPLING ARRANGEMENT. AUG. 30, 1977. FRA. 7631197.
4,136,277.—EXPOSURE CONTROL SYSTEM FOR A DOCUMENT COPYING MACHINE. JAN. 23, 1979. GRB. 1529220.

Class 25C 1

3,296,483.—WIDEBND AMPLER UTLZNG COMN ELCTRN BEAM FR INTRACTN W/HIFRQCY TRVLGWAVE LINE AND W/LOWFRQCY ELCTRN M. JAN. 3, 1967.
3,299,367.—FEEDBACK AMPLIFIER. JAN. 17, 1967.
3,404,341.—ELECTROMETER UTILIZING A DUAL PURPOSE FIELD-EFFECT TRANSISTOR. OCT. 1, 1968.
3,457,520.—FIELD EFFECT TRANSISTOR BUFFER AMPLIFIER. JULY 22, 1969. CAN. 0830628, FRA. 1541017, GER. 1562109, GRB. 1189515, ITL. 0806188, JAP. 0573712.
3,525,948.—SEISMIC AMPLIFIERS. AUG. 25, 1970.
3,594,654.—DIRECT COUPLED DIFFERENTIAL AMPLIFIER. JULY 20, 1971.
3,790,288.—PHOTOMETER INCLUDING VARIABLE AMPLIFICATION AND DARK CURRENT COMPENSATION. FEB. 5, 1974.

Class 25C 2

3,316,495.—LOW LEVEL COMMUTATOR. APR. 25, 1967.
3,426,259.—ELECTRIC CONTROL CIRCUITS FOR SEQUENTIAL OPERATION OF MOTIVE MEANS. FEB. 4, 1969.
3,454,884.—DUTY CYCLE CONTROL CIRCUIT. JULY 8, 1969. CAN. 0859886, GRB. 1195983, JAP. 0576017.
3,612,907.—SELF-CHECKING FLIP-FLOP. OCT. 12, 1971.
3,668,414.—TRANSITION INTEGRATION SWITCHING AMPLIFIER. JUNE 6, 1972. ARG. 0183473, AUS. 0460647, BEL. 0765005, CAN. 0930432, FRA. 7111626, GRB. 1334407, ITL. 0921529, MEX. 0119755, USR. 0420197, VZL. 0027511.
3,795,857.—ELECTRICAL CONNECTOR TESTING APPARATUS HAVING A PLURALITY OF AND GATES. MAR. 5, 1974.
3,806,242.—APPARATUS FOR REGULATING OPERATION OF DEV IN ACCORDANCE W SUPPLY OF MATERIAL UPON WHICH DEV OPER. APR. 23, 1974. CAN. 1004288, GRB. 1387190.
3,828,222.—FLASH LAMP CIRCUIT. AUG. 6, 1974.
3,856,997.—INDICATING AND SWITCHING APPARATUS. DEC. 24, 1974. BEL. 0809124, CAN. 1004261, ITL. 1002375, MEX. 0135820, SPN. 0421710.
3,866,051.—DIGITAL INTERFACE MODULE. FEB. 11, 1975. BEL. 0810490, GBR. 1455213.
3,932,770.—CONTROL CIRCUIT FOR SWITCHING TRIACS. JAN. 13, 1976.
4,119,840.—FAST-ACTING GAIN PHOTOCURRENT DEVICE. OCT. 10, 1978.

Class 25C 3

3,311,810.—STATIC FREQUENCY MULTIPLIER UTILIZING A PLURALITY OF SATURABLE MAGNETIC CORES. MAR. 28, 1967.
3,340,416.—RADIATION GENERATOR HVNG A CONDCTV COATNG ON A PIEZO-ELCTRC DIFFRCTN GRATING FOR VARYNG OTPT FR. SEPT. 5, 1967.
3,373,377.—SELF-ADJUSTING VARIABLE FREQUENCY SAWTOOTH GENERATOR. MAR. 12, 1968.
3,543,080.—CRT PINCUSHION DISTORTION CORRECTION APPARATUS. NOV. 24, 1970.
3,659,207.—MULTI-WAVE FORM GENERATION FROM A SINGLE TAPPED DELAY LINE. APR. 25, 1972.
4,048,571.—FREQUENCY DOUBLER. SEPT. 13, 1977.

Class 25C 4

RE.27,720.—SIGNAL STORAGE DEVICE - RE OF 3416,861-D1593. AUG. 7, 1973.
3,280,309.—LOGARITHMIC PULSE COUNTER. OCT. 18, 1966.
3,416,861.—SIGNAL STORAGE DEVICE—REISSUED D72104-27,720. DEC. 17, 1968. CAN. 0824770, GER. 1524998, GRB. 1184579, JAP. 0571176.
3,422,287.—PULSE STRETCHING CIRCUIT FOR GENERATING PULSES OF MINIMUM WIDTH. JAN. 14, 1969. AUS. 0408950, CAN. 0814593, GRB. 1087749, ITL. 0773401, SWD. 0337041.
3,593,043.—PULSE SHAPING CIRCUIT. JULY 13, 1971.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,757,032.—METHOD AND APPARATUS FOR SELECTIVELY ENABLING A REMOTE RECEIVER. SEPT. 4, 1973.
3,781,548.—CONTROL SYSTEM. DEC. 25, 1973.
3,816,727.—ECHO CHECK CIRCUIT. JUNE 11, 1974. CAN. 0999463, FRA. 7341866, GRB. 1422835.
3,839,665.—APP MEASRNG RELTV VELCTY MOVBL MEMBR INCLDNG MEANS TO DETECT VELCTY FROM POSITION ENCODER. OCT. 1, 1974. CAN. 0980409, GRB. 1290090, JAP. 0832378.
3,863,143.—APP FOR RECORDING THE OCCURRENCE OF A PREDETERMINED OPERATION BY SENSING MAGNETIC FIELD OPERATION. JAN. 28, 1975.
3,875,387.—MAGNETIC OPERATIONS MONITOR. APR. 1, 1975.
3,931,580.—DIGITAL LINE RECEIVER CIRCUIT. JAN. 6, 1976.
3,953,708.—THERMAL PRINTER USING AMORPHOUS SEMICONDUCTOR DEVICES. APR. 27, 1976.
3,971,919.—PROGRAMMABLE BILLING SYSTEM. JULY 27, 1976. BEL. 0812673, FRA. 7409746, GRB. 1451993, ITL. 1007663, SPN. 0424543.
3,983,315.—ELECTROMAGENTIC COUNTER CIRCUIT. SEPT. 28, 1976.
3,987,311.—SHIFT REGISTER UTILIZING AMORPHOUS SEMICONDUCTOR THRESHOLD SWITCHE. OCT. 19, 1976.
3,989,930.—MULTI-MODE BILLING SYSTEM CONTROLLED BY COPY SIZE AND DOCUMENT ORIGINAL SIZE. NOV. 2, 1976.
4,119,907.—POWER FACTOR CORRECTOR FOR A RESISTIVE LOAD. OCT. 10, 1978.
4,140,962.—HIGH VOLTAGE REGULATOR USING LIGHT DEPENDENT RESISTOR. FEB. 20, 1979. BEL. 867865.

Class 25C 5

3,275,837.—XEROGRAPHIC CHARGING APPARATUS. SEPT. 27, 1966. ARG. 0158430, ATR. 0242511, AUS. 0276177, BEL. 0642095, CAN. 0753356, FRA. 1385736, GER. 1488286, GRB. 1040264, ITL. 0712888, JAP. 0477814, MEX. 0075819, STZ. 0460930, SWD. 0314133.
3,496,385.—HIGH VOLTAGE COMPENSATED TRANSISTORIZED SWITCHING APPARATUS. FEB. 17, 1970. CAN. 0853862, FRA. 1521443, GRB. 1181718, ITL. 0793728, JAP. 0592682.
3,522,509.—FLOATING POWER SUPPLY. AUG. 4, 1970.
3,809,916.—DUAL CORD INTERLOCK. MAY 7, 1974. CAN. 1004283, GRB. 1423758.
3,870,903.—PHASE CONTROLLED POWER SUPPLY. MAR. 11, 1975.
3,922,595.—HIGH POWER REGULATED D C SUPPLY. NOV. 25, 1975.
3,961,236.—CONSTANT POWER REGULATOR FOR XEROGRAPHIC FUSING SYSTEM. JUNE 1, 1976.
4,004,209.—WIDE RANGE POWER CONVERSION SYSTEM. JAN. 18, 1977.

Class 25C 6

3,192,519.—DIGITAL TRANSIENT ANALYZER. JUNE 29, 1965.
3,376,490.—SYNTHESIZED WAVE STATIC INVERTERS. APR. 2, 1968.
3,508,080.—BRIDGE GATING NETWORK HAVING POWER GAIN. APR. 21, 1970.
3,555,540.—DIGITAL TO ANALOG CONVERTER WITH SMOOTHED RECOVERY. JAN. 12, 1971.
3,599,037.—GAS LAMP LEAD BALLAST CIRCUIT HAVING FEED CONTROL. AUG. 10, 1971. ARG. 0182960, BEL. 0749784, CAN. 0907126, FRA. 7015813, GRB. 1308525, ITL. 0900023, MEX. 0116550.
3,638,089.—SPEED CONTROL SYSTEM HAVING HIGH AND LOW LEVEL SPEED MEANS. JAN. 25, 1972. GRB. 1322611.
3,670,269.—AUTOMATIC TRANSVERSAL EQUALIZER. JUNE 13, 1972. CAN. 0932412, GRB. 1353018.
3,689,915.—ENCODING SYSTEM. SEPT. 5, 1972. CAN. 0870252, GER. 1562051, GRB. 1207701, JAP. 0675600.
3,691,542.—MAGNETIC MEMORY DISK DRIVE APPARATUS WITH REDUCED R.F. NOISE. SEPT. 12, 1972. GRB. 1328717, JAP. 0840914.
3,699,555.—APPARATUS FOR RAPID ACTION DISPLACEMENT CONTROL. OCT. 17, 1972. CAN. 985413, GRB. 1366124.
3,737,569.—TRANSMISSION DEVICE. JUNE 5, 1973.
3,742,374.—TRANSDUCER DEVICE. JUNE 26, 1973.
3,761,799.—CURRENT STABILIZING CIRCUIT HAVING MINIMAL LEAKAGE CURRENT EFFECTS. SEPT. 25, 1973. BEL. 0792285. FRA. 7243406, GRB. 1395600, ITL. 0971515, MEX. 131737.
3,778,817.—OUTPUT KEYBOARD APPARATUS AND SIGNAL TRANSLATING METHODS THEREFOR. DEC. 11, 1973.
3,795,857.—ELECTRICAL CONNECTOR TESTING APPARATUS HAVING A PLURALITY OF AND GATES. MAR. 5, 1974.
3,818,297.—MOTOR CONTROL APPARATUS. JUNE 18, 1974. CAN 1004296, GRB. 1454269.
3,832,065.—DRUM TRACK DETECTOR. AUG. 27, 1974. GRB. 1458283.
3,880,516.—DIAGNOSTIC CIRCUIT BOARD. APR. 29, 1975. BEL. 0808231, FRA. 7342590, GRB. 1447394, ITL. 1002163, SPN. 421149.
3,904,922.—LAMP CONTROL AND LAMP SWITCH CIRCUIT. SEPT. 9, 1975.
3,906,194.—SIGNAL PROCESSOR. SEPT. 16, 1975.
3,909,125.—STEPPER MOTOR CONTROL. SEPT. 30, 1975.
3,918,046.—DIGITAL TO ANALOG CONVERTER. NOV. 4, 1975. ARG. 0197211, BEL. 0795801, FRA. 7305890, GRB. 1417772, ITL. 0979289, MEX. 131264, SPN. 0411883, STZ. 0564887.
3,922,595.—HIGH POWER REGULATED D C SUPPLY. NOV. 25, 1975.
3,928,772.—TIME DEPENDENT FAULT DETECTOR. DEC. 23, 1975. BEL. 0826690.
3,989,371.—CYCLE-OUT LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. NOV. 2, 1976.
3,991,355.—STEPPER MOTOR CONTROL. NOV. 9, 1976.
4,002,409.—CHAIN-FEED CONTROL LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. JAN. 11, 1977. BEL. 0840300.
4,074,147.—SWITCHING AMPLIFIERS. FEB. 14, 1978.
4,101,788.—MOS BUFFER CIRCUIT. JULY 18, 1978.
4,103,252.—CAPACITIVE TOUCH-ACTIVATED TRANSDUCER SYSTEM INCLUDING A PLURALITY OF OSCILLATORS. JULY 25, 1978.
4,129,807.—CURRENT REGULATING CIRCUIT FOR MAGNETIC DEFLECTION SYSTEMS. DEC. 12, 1978.
4,163,988.—SPLIT GATE V GROOVE FET. AUG. 7, 1979.
4,177,421.—CAPACITIVE TRANSDUCER. DEC. 4, 1979.
4,193,079.—MESFELT WITH NON-UNIFORM DOPING. MAR. 11, 1980.

Class 26

D.225,572.—BOOK STACKING UNIT FOR XEROGRAPHIC REPRODUCTION MACHINE. DEC. 19, 1972.
D.231,127.—COPYING MACHINE-LARGE DOCUMENT COPYING FRAME-DECOY. APR. 2, 1974.
D.231,128.—COPYING MACHINE. APR. 2, 1974.
D.231,129.—COPYING MACHINE. APR. 2, 1974.
D.231,564.—COPYING MACHINE. APR. 30, 1974.
D.236,030.—PAPER TRAY. JULY 22, 1975.
D.236,446.—CART. AUG. 26, 1975.
D.236,491.—COMPUTER CABINET. AUG. 26, 1975.
D.236,897.—COMPUTER CABINET. SEPT. 23, 1975.
D.236,961.—BALANCE SCALE. SEPT. 30, 1975.
D.238,450.—PAPER CASSETTE. JAN. 13, 1976.
D.238,966.—COPIER EVENT RECORDER. FEB. 24, 1976.

D.239,063.—STORAGE UNIT. MAR. 9, 1976.
D.239,064.—STORAGE UNIT. MAR. 9, 1976.
D.239,065.—STORAGE UNIT. MAR. 9, 1976.
D.239,066.—STORAGE UNIT. MAR. 9, 1976.
D.239,067.—STORAGE AND DISPLAY UNIT. MAR. 9, 1976.
D.239,106.—SEMICONDUCTOR EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,107.—PARALLEL RL/RC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,108.—RLC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,109.—SERIES RL AND RC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,110.—EDUCATIONAL DEVICE FOR LEARNING ABOUT RECTIFIERS AND FILTERS. MAR. 9, 1976.
D.239,351.—STORAGE AND DISPLAY UNIT. MAR. 30, 1976.
D.239,392.—COMPUTER CABINET. MAR. 30, 1976.
D.239,750.—STORAGE UNIT. MAY 4, 1976.
D.239,995.—STORAGE UNIT. MAY 25, 1976.
D.240,192.—DESIGN FOR MICROFILM REEL. JUNE 8, 1976.
D.240,540.—COMPUTER TERMINAL. JULY 13, 1976.
D.240,554.—DUPLICATING MACHINE WITH SORTER. JULY 13, 1976.
D.240,555.—SORTER. JULY 13, 1976.
D.240,557.—TRAY RACK. JULY 13, 1976.
D.240,965.—COIN OPERATED REPRODUCTION MACHINE. AUG. 10, 1976.
D.241,982.—ADAPTER FOR COMPRESSING HUMAN BODY ORGANS FOR X-RAY TREATMENT OR THE LIKE. OCT. 19, 1976.
D.246,226.—TONER CONTAINER OR THE LIKE. NOV. 1, 1977.
D.247,673.—STRIPPER PAD. APR. 4, 1978.
D.247,674.—STRIPPER PAD. APR. 4, 1978.
D.247,675.—STRIPPER PAD. APR. 4, 1978.
D.248,765.—MICROFICHE COPIER. AUG. 1, 1978.
D.250,765.—FANFOLD SHEET STACKING TRAY. JAN. 9, 1979.

Class 26A

D.200,130.—XEROGRAPHIC CAMERA. JAN. 19, 1965.
D.200,448.—DOCUMENT REPRODUCING APPARATUS. FEB. 23, 1965.
D.205,806.—REPRODUCTION MACHINE. SEPT. 20, 1966.
D.227,933.—SORTER. JULY 24, 1973.
D.236,850.—CONTROL PANEL FOR A COPIER. SEPT. 16, 1975.
D.237,905.—CONTROL PANEL OF A COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. DEC. 2, 1975.
D.238,779.—DOCUMENT TRAY. FEB. 10, 1976.
D.238,818.—PLATEN COVER FOR COPIER. FEB. 10, 1976.
D.239,138.—XEROGRAPHIC COPIER. MAR. 9, 1976.

Class 26A 1

D.200,272.—DOCUMENT REPRODUCING APPARATUS. FEB. 9, 1965. CAN. 2092730.
D.200,448.—DOCUMENT REPRODUCING APPARATUS. FEB. 23, 1965.
D.205,558.—REPRODUCTION MACHINE. AUG. 16, 1966.
D.205,806.—REPRODUCTION MACHINE. SEPT. 20, 1966.
D.208,337.—XEROGRAPHIC DOCUMENT REPRODUCING APPARATUS OR SIMILAR ARTICLE. AUG. 15, 1967.
D.210,558.—DOCUMENT REPRODUCING MACHINE. MAR. 19, 1968.
D.210,630.—DOCUMENT REPRODUCING APPARATUS. MAR. 26, 1968.
D.210,856.—DOCUMENT REPRODUCING APPARATUS. APR. 23, 1968.
D.214,699.—DOCUMENT REPRODUCING MACHINE. JULY 15, 1969. ARG. 0011028, CAN. 2543184, MEX. 0011135.
D.218,199.—DOCUMENT REPRODUCING MACHINE. JULY 28, 1970. CAN. 0033011, GRB. 0946459.
D.218,201.—REPRODUCTION MACHINE. JULY 28, 1970. ARG. 0014313, BEL. 0017005, CAN. 0033518, CHL. 0000996, GRB. 0946818, JAP. 0363075, MEX. 0011194, PNM. 0002073, VZL. 0000744.
D.219,889.—XEROGRAPHIC PROCESSOR HOUSING. FEB. 9, 1971.
D.221,694.—XEROGRAPHIC PROCESS HOUSING. AUG. 31, 1971.
D.227,931.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JULY 24, 1973.
D.230,513.—REPRODUCTION MACHINE. FEB. 26, 1974.
D.238,737.—COPYING MACHINE STAND. FEB. 10, 1976.
D.243,008.—COIN OPERATED REPRODUCTION MACHINE. JAN. 11, 1977.

Class 26A 2

D.214,959.—AUTOMATIC DOCUMENT FEEDING APPARATUS FOR XEROGRAPHIC REPRODUCING MACHINES OR THE LIKE. AUG. 12, 1969. CAN. 0032540, GER. DES5715, GRB. 0942720.
D.227,034.—DOCUMENT FEEDER FOR A XEROGRAPHIC REPRODUCTION. MAY 29, 1973.
D246,373.—PAPER OVERFEED TRAY. NOV. 15, 1977.

Class 26A 3

D.200,129.—XEROGRAPHIC TRANSFER AND FUSING APPARATUS. JAN. 19, 1965.
D.233,481.—XEROGRAPHIC VAPOR FUSING APPARATUS. OCT. 29, 1974.

Class 26A 4

D.201,405.—XEROGRAPHIC PRINTER. JUNE 15, 1965.
D.220,188.—MOBILE PRINTER. MAR. 16, 1971. CAN. 0033207, GER. 0MR6294, GRB. 0946460, JAP. 0443861.
D.230,517.—COMPUTER OUTPUT PRINTER. FEB. 26, 1974.
D.232,125.—CHARACTER PRINT MEMBER. JULY 16, 1974.
D.237,010.—COMBINED RIBBON AND CARTRIDGE THEREFOR. SEPT. 30, 1975. FRA. 0073134, GRB. 0967791, ITL. 0010845.
D.238,904.—CHARACTER PRINT MEMBER. FEB. 17, 1976.
D.238,968.—CHARACTER PRINT MEMBER. FEB. 24, 1976. FRA. 0073135, GER. 0009989, GRB. 0967792, ITL. 0010846.
D.250,950.—CONTROL CONSOLE MODULE FOR A COMPUTER PRINTER. JAN. 30, 1979.
D.250,952.—MODULAR COMPUTER PRINTER. JAN. 30, 1979.
D.250,953.—MODULAR COMPUTER PRINTER. JAN. 30, 1979.
D.250,954.—MODULAR COMPUTER PRINTER. JAN. 30, 1979.

Class 26A 5

D.200,130.—XEROGRAPHIC CAMERA. JAN. 19, 1965.

Class 26B

D.209,408.—CABINET FOR SORTING AND HOLDING SHEETS OF PRINTED MATERIAL. NOV. 28, 1967.
D.209,409.—MODULAR CABINET FOR SORTING AND HOLDING SHEETS OF PRINTED MATERIAL. NOV. 28, 1967.
D.209,872.—DOCUMENT REPRODUCING AND SORTING MACHINE. JAN. 9, 1968.
D.212,227.—A TAPE CONTRL UNIT FOR AN AUTOMATIC SORTER OR THE LIKE. SEPT. 17, 1968.
D.224,054.—XEROGRAPHIC REPRODUCTION MACHINE OR THE LIKE. JUNE 27, 1972.
D.230,515.—DOCUMENT REPRODUCING AND SORTING MACHINE. FEB. 26, 1974.
D.236,330.—REPRODUCTION MACHINE STACKING CART. AUG. 19, 1975.
D.236,924.—PAPER HANDLING STAND. SEPT. 30, 1975.
D.237,871.—REPRODUCTION MACHINE STACKING CART. DEC. 2, 1975.
D.238,779.—DOCUMENT TRAY. FEB. 10, 1976.

Class 26C

D.205,910.—A CAN. OCT. 4, 1966.
D.208,377.—CONTAINER FOR XEROGRAPHIC TONER POWDER. AUG. 22, 1967.
D.211,928.—BOTTLE. AUG. 13, 1968.
D.218,152.—CONTAINER FOR XEROGRAPHIC POWDER. JULY 28, 1970. CAN. 0032629, GRB. 0944047.
D.236,694.—DEVELOPER MIX STORAGE CONTAINER. SEPT. 9, 1975.
D.240,201.—TONER PARTICLE STORAGE CONTAINER-DESIGN FOR TONER CARTRIDGE. JUNE 8, 1976.
D.244,007.—TONER BOTTLES. APR. 12, 1977.
D.252,557.—TONER CONTAINER. AUG. 7, 1979.

Class 26D

D.216,647.—SPRING SCALE. FEB. 24, 1970. CAN. 0032577, GRB. 0943939.
D.220,011.—ARTICLE ADDRESSING MACHINE. FEB. 23, 1971.

3,666,948.—LIQUID CRYSTAL INFRARED IMAGING SYSTEM HAVING AN UNDISTURBED IMAGE ON A DISTURBED BACKGROUND. MAY 30, 1972. CAN. 0964455, GRB. 1387276.
3,737,896.—APPARATUS FOR RECOVERY OF RECORDED BIT INFORMATION IN A MAGNETIC RECORDING MEDIUM. JUNE 5, 1973. AUS. 0471989, BEL. 0790688, CAN. 1008967, STZ. 0563642.
D.246,102.—FILM REEL (DESIGN). OCT. 18, 1977.

Class 26E

D.200,128.—FACSIMILE RECEIVER. JAN. 19, 1965.

Class 26E 1

D.200,127.—FACSIMILE TRANSMITTER. JAN. 19, 1965.
D.200,128.—FACSIMILE RECEIVER. JAN. 19, 1965.
D.215,218.—FACSIMILE TRANSCEIVER. SEPT. 16, 1969. ARG. 0010244, BEL. 0016600, CAN. 2493134, FRA. 0096592, GER. 0005411, GRB. 0939330, ITL. 0134198. MEX. 0010900.
D.218,170.—FACSIMILE TRANSCEIVER. JULY 28, 1970. GRB. 0944047.
D.225,860.—HOUSING FOR ELECTRONIC APPARATUS. JAN. 9, 1973.
D.225,861.—HOUSING FOR ELECTRONIC APPARATUS. JAN. 9, 1973.
D.225,867.—UNATTENDED TELEPHONE ANSWERING APPARATUS OR SIMILAR ARTICLE. JAN. 9, 1973.
D.227,121.—FACSIMILE TRANSCEIVER APPARATUS. JUNE 5, 1973.
D.227,122.—FACSIMILE TRANSCEIVER APPARATUS. JUNE 5, 1973.

Class 26E 2

D.215,849.—A ROLL-FEED APPARATUS FOR A FACSIMILE TRANSCEIVER. NOV. 4, 1969. ARG. 0011067, BEL. 0016764, CAN. 0032344, GER. DES5719, GRB. 0942723, ITL. 0138774, MEX. 0010975, PNM. 0001983, VZL. 0000663.
D.216,123.—FLEXIBLE SHEET MATERIAL GUIDE FOR A FACSIMILE TRANSCEIVER OR SIMILAR ARTICLE. NOV. 25, 1969. GRB. 0942748.
D.216,564.—GUIDE FOR FLEXIBLE SHEET MATERIAL FOR FACSIMILE TRANSCEIVER OR SIMILAR ARTICLE. FEB. 10, 1970. ARG. 0011068, BEL. 0016763, GER. DES5716, GRB. 0942723, ITL. 0138775, MEX. 0011018, PNM. 0001401, VZL. 0000662.
D.249,688.—PAPER TAKE UP REEL OR SIMILAR ARTICLE FOR A WEB FED FACSIMILE TRANSCEIVER OF THE LIKE. SEPT. 26, 1978.

Class 26E 3

D.210,589.—ELECTRONIC ADAPTER FOR FACSIMILE COMPUTER SYSTEM. MAR. 26, 1968.

Class 26F

D.203,012.—DESIGN FOR A MACHINE FOR APPLYING INTELLIGENCE TO A MOVING ARTICLE. NOV. 23, 1965.
D.244,943.—FILM REEL (DESIGN). JULY 5, 1977.
D.246,102.—FILM REEL (DESIGN). OCT. 18, 1977.
D.247,667.—FILM REEL (DESIGN). APR. 4, 1978.

Class 26F 1

D.202,746.—MICROFICHE PRINTER. NOV. 2, 1965.
D.217,739.—COMBINED MICROFILM VIEWER AND REPRODUCING MACHINE ACCESSORY. JUNE 2, 1970. CAN. 0032698.
D.218,782.—PROJECTION VIEWER. SEPT. 22, 1970. CAN. 0033031, GER. OMR6147, GRB. 0945494, JAP. 413894.
D.218,783.—COMBINATION FILM VIEWING AND REPRODUCING MACHINE. SEPT. 22, 1970. CAN. 0033032, GER. OMR6146, GRB. 0945495, JAP. 0377263.
D.233,369.—MICROFILM XEROGRAPHIC MACHINE. OCT. 22, 1974.
D.236,544.—MICROFORM VIEWER. AUG. 26, 1975.
D.239,055.—HAND-HELD VIEWER FOR MICROFORMS. MAR. 2, 1976.
D.239,056.—HAND-HELD VIEWER FOR MICROFORMS. MAR. 2, 1976.
D.247,295.—MULTICOLOR TRANSPARENCY REPRODUC-TION MACHINE. FEB. 21, 1978.

Class 26G

D.225,643.—REACTION TESTING DEVICE. DEC. 26, 1972.
D.225,681.—SUCTION MOUNTING DEVICE. DEC. 26, 1972.
D.226,662.—EDUCATIONAL DEVICE FOR DEMONSTRATING MOMENTUM. APR. 10, 1973.
D.232,030.—EDUCATIONAL AID FOR DEMONSTRATING PRINCIPLES IN PHYSICS. JULY 9, 1974.
D.232,031.—COLLISION DEMONSTRATION TEACHING AID. JULY 9, 1974.
D.232,098.—TEACHING AID FOR DEMONSTRATING PRINCIPLES IN PHYSICS. JULY 16, 1974.
D.232,698.—CLAMP. SEPT. 10, 1974.
D.233,432.—TEACHING AID FOR DEMONSTRATING PRINCIPLES OF PHYSICS. OCT. 29, 1974.
D.233,654.—CONTAINER FOR BOOKLETS OR THE LIKE. NOV. 19, 1974.
D.233,658.—BALANCE SCALE. NOV. 19, 1974.
D.233,935.—EDUCATIONAL DEVICE FOR TEACHING ARITHMETIC. DEC. 17, 1974.
D.234,546.—CARRYING CASE. MAR. 18, 1975.
D.235,440.—EDUCATIONAL PLUG-IN BOARD. JUNE 17, 1975.
D.235,441.—BASIC MEASUREMENT EDUCATIONAL BOARD. JUNE 17, 1975.
D.236,028.—MAGNIFIER. JULY 22, 1975.
D.236,729.—EDUCATIONAL PLUG-ON BOARD. SEPT. 9, 1975.
D.236,730.—EDUCATIONAL PLUG-ON BOARD. SEPT. 9, 1975.
D.236,978.—SWITCHING EDUCATIONAL BOARD. SEPT. 30, 1975.
D.236,979.—EDUCATIONAL MEASURING DEVICE BOARD. SEPT. 30, 1975.
D.237,020.—COMBINED SUPPORT AND STORAGE TRAY FOR AN EDUCATIONAL KIT OR SIMILAR ARTICLE. SEPT. 30, 1975.
D.237,877.—MOTOR AND GENERATOR EDUCATIONAL BOARD. DEC. 2, 1975.
D.237,878.—MULTI-METER EDUCATIONAL BOARD. DEC. 2, 1975.
D.237,879.—EDUCATIONAL DEVICE FOR LEARNING MAGNETISM & INDUCTION. DEC. 2, 1975.
D.237,880.—EDUCATIONAL DEVICE FOR LEARNING BASIC HAND TOOLS. DEC. 2, 1975.
D.242,787.—AN EDUCATIONAL AIDE FOR MEASURING MASS. DEC. 21, 1976.
D.242,793.—EDUCATIONAL AIDE FOR TEACHING PHYSICAL PROPERTIES OF LIGHT. DEC. 21, 1976.

Class 26G 1

D.216,157.—BALANCE SCALE. NOV. 25, 1969. BEL. 0016761, CAN. 0032611, GER. DES5718, GRB. 0942720, ITL. 0138772, JAP. 0337548.
D.236,731.—CURCUIT TESTING EDUCATIONAL BOARD. SEPT. 9, 1975.

Class 26H

D.236,556.—CARRYING CASE FOR COLORISTS MATERIALS OR THE LIKE. AUG. 26, 1975.

Class 26H 1

D.215,294.—HOUSING FOR ELECTRONIC APPARATUS. SEPT. 23, 1969. ARG. 0011066, BEL. 0016760, GER. 0005765, GRB. 0942725, ITL. 0138776, MEX. 0010934, PNM. 0001839, VZL. 0000664.
D.215,660.—HOUSING FOR ELECTRONIC APPARATUS. OCT. 21, 1969.
D.234,700.—DISC DRIVE CABINET. APR. 1, 1975.
D.238,494.—CONTROL PANEL FOR DISK FILE. JAN. 20, 1976.
D.238,495.—DISK MEMORY MODULE FRONT PANEL. JAN. 20, 1976.
D.240,632.—CABINET FOR ELECTRONIC EQUIPMENT. JULY 20, 1976.
D.241,446.—SINGLE MAGNETIC CARD CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,447.—SINGLE MAGNETIC TAPE CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,448.—DUAL MAGNETIC TAPE CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,449.—DUAL MAGNETIC CARD CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.254,492.—DUAL MAGNETIC DISC-CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. MAR. 18, 1980.

Class 26H 2

D.221,228.—KEYBOARD FOR A COMPUTER OR THE LIKE. JULY 20, 1971.

Class 26H 3

D.221,229.—SEND/RECEIVE DATA PRINTER TERMINAL. JULY 20, 1971.
D.224,019.—XEND/RECEIVE DATA PRINTER TERMINAL. JUNE 27, 1972.
D.236,129.—INPUT/OUTPUT TERMINAL. JULY 29, 1975.

Class 26H 4

D.212,692.—TELEPHONE ACOUSTIC COUPLER. NOV. 12, 1968. ARG. 0010245, BEL. 0016601, CAN. 2503147, FRA. 0096593. GER. 0005410, GRB. 0939331, ITL. 1341991, MEX. 0010845.
D.224,025.—ACOUSTIC COUPLER. JUNE 27, 1972.

Class 26H 5

D.204,319.—HOLLOW CORNER PRISM. APR. 5, 1966.
D.206,956.—HOLLOW CORNER PRISM. FEB. 14, 1967.
D.237,849.—COOLING RACK. DEC. 2, 1975.

Class 26H 6

D.221,108.—PAPER SHREDDER. JULY 6, 1971. CAN. 0033939.

Class 26H 7

D.221,901.—OVERHEAD PROJECTOR. SEPT. 14, 1971. CAN. 0033920.
D.231,800.—RIBBON CARTRIDGE. JUNE 11, 1974.
D.236,787.—BOOKCASE OR SIMILAR ARTICLE. SEPT. 16, 1975.
D.239,419.—TAPE CASSETTE STORAGE UNIT. MAR. 30, 1976.
D.239,472.—MAGNETIC CARD STORAGE TRAY. APR. 6, 1976.
D.239,531.—COPY HOLDER. APR. 13, 1976.
D.239,872.—CAMERA/PROJECTOR. MAY 11, 1976.
D.241,774.—PRINTER/KEYBOARD APPARATUS FOR ELECTRONIC TYPING SYSTEM OR SIMILAR ARTICLE. OCT. 5, 1976.
D.242,101.—FILE UNIT OR SIMILAR ARTICLE. NOV. 2, 1976.
D.242,102.—TABLE OR SIMILAR ARTICLE. NOV. 2, 1976.

Class 27A

3,615,614.—LIGHT DEV DIRCT PRINT SILVER HALIDE EMULSION SENSITIZD W/ COMBINTN OF COPPER, LEAD, BROMIDE AND THIOU. OCT. 26, 1971.
3,660,100.—DIRECT-PRINT LIGHT DEVELOPABLE EMULSION. MAY 2, 1972.
3,725,073.—LIGHT DEVELOPABLE DIRECT WRITING, SILVER HALIDE EMULSIONS CONTAINING GOLD, IODINE, LEAD AND COP. APR. 3, 1973. CAN. 0882613.
3,782,960.—DRCT-PRNT LIGHT-DVLPBL EMULSN CNTAING SILVER HALIDE GRAINS SNSTZD SENSTZD ON THE SURFACES W/SI. JAN. 1, 1974. BEL. 0780680, CAN. 0994590, GRB. 1384081, ITL. 0950280.
3,849,146.—DIRECT-PRINT LIGHT-DEVELOPBL SILVER HALIDE EMULSION CONTAINING CYCLIC DIOXIDE OR SELENONE AS SEN. NOV. 19, 1974.

Class 27B

3,631,232.—APPARATUS FOR SIMULATING THE ELECTRICAL CHARACTERISTICS OF A NETWORK. DEC. 28, 1971. CAN. 0951429, GRB. 1267785.
4,125,318.—TIR MODULATOR. NOV. 14, 1978.

Class 27C

3,736,133.—TRANSPARENT INK—ABSORBENT LACQUERS. MAY 29, 1973. ARG. 0193996, CAN. 0985583, GRB. 1390137, MEX. 0127276, VZL. 0033577.
3,773,513.—DIMENSIONALLY STABLE PHOTOGRAPHIC PAPER CONTAINING GLASS FIBERS. NOV. 20, 1973.

Class 27D

3,393,362.—PROCESS FOR DETECTING IRREGULARITIES IN A METALLIC SURFACE. JULY 16, 1968.

Class 27H 1

4,077,019.—TRANSVERSE MODE CONTROL IN DOUBLE-HETEROSTRUCTURE LASERS UTILIZING SUBSTRATE LOSS. FEB. 28, 1978.

Class 30

3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 30A

3,573,904.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. APR. 6, 1971. ARG. 0188621, AUS. 0408972, BEL. 0708975, CAN. 0883746, FRA. 1563782, GER. 1671591, GRB. 1215957, ITL. 0822303, JAP. 0620886, MEX. 0100810, VZL. 0023682.
3,707,368.—MANIFOLD IMAGING PROCESS. DEC. 26, 1972.
3,741,762.—MANIFOLD IMAGING MEMBER AND PROCESS. JUNE 26, 1973. CAN. 0961909, GRB. 1376391.
3,955,975.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A METAL SOAP. MAY 11, 1976.

Class 30B

3,642,363.—MANIFOLD IMAGING SYSTEM. FEB. 15, 1972. CAN. 0960289, GRB. 1328405, JAP. 0770137.
3,661,454.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. MAY 9, 1972.
3,684,362.—TRANSPARENT ELECTRODE. AUG. 15, 1972. CAN. 0932378, GRB. 1340685, JAP. 0758465.
3,741,641.—MANIFOLD IMAGING APPARATUS. JUNE 26, 1973.
3,748,034.—MANIFOLD IMAGING MACHINE. JULY 24, 1973. BEL. 0777713, CAN. 0948694, FRA. 7200999, GRB. 1376661, ITL. 0946353, SPN. 0398585, SWD. 7200573.
3,761,174.—MANIFOLD WEB HANDLING. SEPT. 25, 1973.
3,768,902.—MANIFOLD IMAGING. OCT. 30, 1973.
3,876,937.—LAYER TRANSFER IMAGING SYSTEM. APR. 8, 1975. CAN. 0933996, GRB. 1282725, JAP. 0726369.
3,963,340.—IMAGING APPARATUS. JUNE 15, 1976.
4,103,995.—IMAGING APPARATUS. AUG. 1, 1978.

Class 30C

3,615,393.—MANIFOLD IMAGING PROCESS EMPLOYING STATIC CHARGE FIELD APPLICATION. OCT. 26, 1971. BEL. 0746582, CAN. 0965829, FRA. 7007627, GRB. 1295533, ITL. 0886478, JAP. 0727962.
3,653,892.—MANIFOLD IMAGING PROCESS WHEREIN THE IMAGED ELEMENTS MAY BE RECOMBINED AND REUSED. APR. 4, 1972. CAN. 0916967, GRB. 1320407, JAP. 0731611.
3,676,116.—IMAGE REVERSAL IN MANIFOLD IMAGING USING ELECTRICALLY CONDUCTIVE RECEIVER SHEET. JULY 11, 1972.
3,684,362.—TRANSPARENT ELECTRODE. AUG. 15, 1972. CAN. 0932378. GRB. 1340685, JAP. 0758465.
3,692,516.—MANIFOLD IMAGING METHOD - PHAROS MANIFOLD IMAGING REVERSAL. AUG. 19, 1972. CAN. 0929204, GRB. 1320012, JAP. 0759476.
3,692,518.—MANIFOLD IMAGING PROCESS. SEPT. 19, 1972. ARG. 0191965, BEL. 0749174, CAN. 0916496, FRA. 7013872, GRB. 1309649, ITL. 0899700, JAP. 0731228, MEX. 0116175.
3,718,462.—MANIFOLD ELECTRIFICATION PROCESS. FEB. 27, 1973. CAN. 0947366, GRB. 1313712, JAP. 0739530.
3,737,311.—ELECTROSTATIC PARTICLES TRANSFER IMAGING PROCESS. JUNE 5, 1973.
3,756,812.—MANIFOLD IMAGING PROCESS. SEPT. 4, 1973.
3,761,258.—IMAGING PROCESS EMPLOYING CHARGED DONOR AND RECEIVER SHEETS. SEPT. 25, 1973.
3,776,721.—MANIFOLD IMAGING. DEC. 4, 1973.
3,844,780.—IMAGING PROCESS. OCT. 29, 1974.
3,846,127.—IMAGING SYSTEM. NOV. 5, 1974.
3,850,626.—IMAGING MEMBER AND METHOD. NOV. 26, 1974. GRB. 1464653.
3,854,943.—MANIFOLD IMAGING METH AND MEMBR EMPLOYING FUNDAMENTAL PARTICLES OF ALPHA METAL FREE PHTHALOCYANINE. DEC. 17, 1974. CAN. 0988766, GRB. 1424234.
3,861,910.—MANIFOLD IMAGING PROCESS. JAN. 21, 1975. ARG. 0198477, BEL. 0744343, CAN. 0947363, FRA. 7001127, GRB. 1284521, ITL. 0885940, JAP. 0727960, MEX. 0111440.
3,909,257.—MANIFOLD IMAGING PROCESS WITH SPOOL ELECTRODE. SEPT. 30, 1975.

Class 30D

3,598,581.—MANIFOLD IMAGING METHOD. AUG. 10, 1971. ARG. 0198157, AUS. 0413154, BEL. 0713100, BRA. 6795099, CAN. 0889250, CHL. 0024249, CLB. 0017928, FRA. 1560020, GER. 1772114, GRB. 1200712, HOL. 0149611, ITL. 0829693, JAP. 0626106, LXB. 0055806,

MEX. 0100797, NOR. 0128040, PRU. 0009737, SPN. 0352316, STZ. 0474097, SWD. 0340404, URG. 0009203, VZL. 0023690.

3,723,112.—MANIFOLD IMAGING METHOD WHEREIN THE ACTIVATOR CARRIES A PLASTIC COATING MATERIAL. MAR. 27, 1973.

3,741,762.—MANIFOLD IMAGING MEMBER AND PROCESS. JUNE 26, 1973. CAN. 0961909, GRB. 1376391.

3,907,558.—MANIFOLD IMAGING UTILIZING SILICA GEL ACTIVATING LAYER. SEPT. 23, 1975.

3,912,504.—MANIFOLD IMAGING WITH THERMAL ACTIVATOR CONTAINED IN A SILICA GEL LAYER. OCT. 14, 1975.

3,955,975.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A METAL SOAP. MAY 11, 1976.

3,964,904.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A DARK CHARGE INJECTING LAYER. JUNE 22, 1976. BEL. 0832405.

4,015,983.—A METHOD OF ERASING MANIFOLD IMAGES. APR. 5, 1977.

4,108,655.—METHOD OF MAKING A THERMO ACTIVE IMAGING MEMBER. AUG. 22, 1978.

Class 30E

3,653,889.—METHOD OF FIXING MANIFOLD IMAGES. APR. 4, 1972. BEL. 0754024, CAN. 0921745, FRA. 7028279, GRB. 1322772, ITL. 0900939, JAP. 0739529.

3,658,519.—IMAGE TRANSFER PROCESS FROM CONDUCTIVE SUBSTRATES. APR. 25, 1972. ARG. 0195536, AUS. 0456406, BEL. 0760747, BRA. 7022093, CAN. 0960290, FRA. 7047144, GRB. 1337590, ITL. 0913848, MEX. 0119590, SWD. 7017293.

3,706,553.—TRANSFER OF IMAGES TO A NON-CONDUCTIVE SUBSTRATE. DEC. 19, 1972. ARG. 0203811, AUS. 0461437, BEL. 0760456, CAN. 0947368, FRA. 7047140, GRB. 1339577, ITL. 0913634, MEX. 0119591, SWD. 7017139.

3,708,288.—IMAGE TRANSFER PROCESS. JAN. 2, 1973. CAN. 0882053, GRB. 1298922, JAP. 0757867.

3,723,112.—MANIFOLD IMAGING METHOD WHEREIN THE ACTIVATOR CARRIES A PLASTIC COATING MATERIAL. MAR. 27, 1973.

3,746,538.—IMAGE TRANSFER PROCESS. JULY 17, 1973. CAN. 0951781, GRB. 1374841.

3,793,017.—IMAGING FIXING METHOD. FEB. 19, 1974.

3,819,368.—MANIFOLD IMAGING MEMBER EMPLOYING A FIXATIVE LAYER. JUNE 25, 1974.

3,825,423.—IMAGE TRANSFER PROCESS. JULY 23, 1974.

3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.

Class 30F

3,548,748.—DUPLICATING METHOD EMPLOYING SIMULTANEOUS APPLICATION OF ELECTRIC FIELD AND EXPOSURE TO RADIATION. DEC. 22, 1970. CAN. 0882051, GRB. 1227394, JAP. 0752522.

3,554,125.—METHOD OF MAKING A LITHOGRAPHIC MASTER AND METHOD OF PRINTING THEREWITH. JAN. 12, 1971. CAN. 0882052, GER. 1772302, GRB. 1219849.

3,565,612.—DUPLICATING MASTERS BY THE MANIFOLD PROCESS. FEB. 23, 1971. ARG. 0193797, AUS. 0411612, BEL. 0708974, CAN. 0873277, FRA. 1549964, GER. 1671590, GRB. 1215956, ITL. 0823464, MEX. 0106608, VZL. 0023681.

3,573,904.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. APR. 6, 1971. ARG. 0188621, AUS. 0408972, BEL. 0708975, CAN. 0883746, FRA. 1563782, GER. 1671591, GRB. 1215957, ITL. 0822303, JAP. 0620886, MEX. 0100810, VZL. 0023682.

Class 30G

3,655,372.—IMAGE REVERSAL IN MANIFOLD IMAGING. APR. 11, 1972.

3,901,697.—MANIFOLD IMAGING PROCESSUSING ELECTRONICS PHOTOSENSITIVE MATERIAL SUBJECT TO LIGHT FATIGUE. AUG. 26, 1975.

Class 30H

3,649,117.—IMAGING PROCESS. MAR. 14, 1972. BEL. 0761133, CAN. 0985732, FRA. 7047700, GRB. 1340679, ITL. 0914070, JAP. 0759480.

3,918,967.—CONTACT REFLEX MANIFOLD IMAGING PROCESS. NOV. 11, 1975. ARG. 0183676, BEL. 0761132, CAN. 0949120, FRA. 7047699, GRB. 1340207, ITL. 0914069, JAP. 0770143, MEX. 0119757, VZL. 0032600.

Class 30I

3,556,783.—COLOR MANIFOLD IMAGING PROCESS. JAN. 19, 1971.

3,853,555.—METHOD OF COLOR IMAGING A LAYER OF ELECTRICALLY PHOTOSENSITIVE AGGLOMERATES. DEC. 10, 1974.

3,854,943.—MANIFOLD IMAGING METH AND MEMBR EMPLOYING FUNDAMENTAL PARTICLES OF ALPHA METAL FREE PHTHALOCYANINE. DEC. 17, 1974. CAN. 0988766, GRB. 1424234.

Class 31

3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.

4,078,923.—MIGRATION IMAGING WITH SURFACTANT-MODIFIED SOLVENT DEVELOPMENT. MAR. 14, 1978.

4,123,283.—SETTING ELECTRICAL LATENT IMAGES IN MIGRATION IMAGING ELEMENTS. OCT. 31, 1978. AUS. 482769. BEL. 813501. CAN. 1037546. FRA. 7412476. GRB. 1471385. ITL. 1009714. MEX. 136227.

4,135,926.—MIGRATION IMAGING PROCESS IN WHICH LATENT IMAGE IS SET. JAN. 23, 1979. AUS. 482769. BEL. 813501. CAN. 1037546. FRA. 7412476. GRB. 1471385. ITL. 1009714. MEX. 136227.

Class 31A

3,520,681.—PHOTOELECTROSOLOGRAPHY. JULY 14, 1970. BRA. 0084241, CAN. 0852692, MEX. 0085656.

3,801,314.—IMAGING SYSTEM. APR. 2, 1974.

3,975,195.—MIGRATION IMAGING SYSTEM. AUG. 17, 1976.

4,009,028.—REVERSE MIGRATION IMAGING SYSTEM. FEB. 22, 1977. BEL. 0827065.

4,013,462.—MIGRATION IMAGING SYSTEM. MAR. 22, 1977.

4,040,826.—IMAGING SYSTEM OF MIGRATION MATERIAL IN SOFTENABLE LAYER. AUG. 2, 1977.

4,062,680.—IMAGING PROCESS EMPLOYING ELECTRICAL OR MAGNETIC REVERSE MIGRATION FORCE AND SOFTENABLE MAT. DEC. 13, 1977. BEL. 827065, FRA. 7509299, GRB. 1497825.

4,157,259.—ERASURE IN MIGRATION IMAGING SYSTEM. JUNE 5, 1979. BEL. 827065. GRB. 1497825.

Class 31B

3,528,355.—CAMERA-PROCESSOR. SEPT. 15, 1970. ARG. 0184627, ATR. 0303513, AUS. 0426557, BEL. 0720022, BRA. 6800654, CAN. 0864811, CHL. 0024251, CLB. 0018453, FRA. 1586179, GER. 1797177, GRB. 1244641, IND. 0117458, ITL. 0839895, LXB. 0056774, MEX. 0103737, NOR. 0128296, NZL. 0153587, PLP. 0006313, PNM. 0001980, PRU. 0010212, PTG. 0050229, SPN. 0357651, STZ. 0516171, SWD. 0338503, URG. 0009309, VZL. 0023698.

3,542,465.—CAMERA WITH DEVELOPMENT MEANS. NOV. 24, 1970. CAN. 0918739, GRB. 1241846, JAP. 0650672.

3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.

3,770,554.—APPARATUS FOR SPLITTING A SOFTENABLE FILM COMPRISING BITE ROLLERS. NOV. 6, 1973.

3,878,816.—IMAGING SYSTEM. APR. 22, 1975.

3,910,475.—SYSTEM FOR ELECTRICALLY GROUNDING OR BIASING A MEMBER. OCT. 7, 1975. FRA. 7404995, ITL. 1007663.

3,951,324.—CAMERA/PROCESSOR/PROJECTOR & SUBSYSTEMS. APR. 20, 1976. FRA. 7439865.

4,025,183.—CAMERA/PROCESSOR/PROJECTOR & SUBSYSTEMS. MAY. 24, 1977. FRA. 7439865.

Class 31C

3,556,781.—MIGRATION IMAGING PROCESS. JAN. 19, 1971. ARG. 0175887, AUS. 0425096, BEL. 0722718, CAN. 0874909, CHL. 0024333, FRA. 1587222, GER. 1804475, GRB. 1250526, GUA. 0002124, ITL. 0855511, MEX. 0103409, PNM. 0001949, PRU. 0010349, SPN. 0359501, STZ. 0506818, SWD. 0340750, URG. 0009365, VZL. 0023713.

3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYR AND CONDUCTIVE LAYER. OCT. 26,

1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360, ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.

3,653,885.—PROCESS OF STABILIZING A MIGRATION IMAGE COMPRISING SELENIUM PARTICLES. APR. 4, 1972. CAN. 0937437.

3,656,990.—ELECTROSOLOGRAPHY. APR. 18, 1972. ARG. 0152723, BRA. 0084169, CAN. 0800550, CHL. 0025766. CLB. 0014944, MEX. 0086246, PNM. 0002518, PRU. 0009465, URG. 0008153, VZL. 0023999.

3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GER. 1964201, GRB. 1291848, JAP. 0726370.

3,713,818.—MIGRATION IMAGING SYSTEM WITH MOLTEN LIQUID DEVELOPMENT. JAN. 30, 1973. CAN. 0933580, GRB. 1358566, USR. 0463275.

3,719,482.—IMAGING SYSTEM. MAR. 6, 1973.

3,720,513.—MIGRATION IMAGING METHOD INVOLVING SOLVENT WASH-AWAY OF UNMIGRATED PARTICLES. MAR. 13, 1973.

3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.

3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.

3,741,757.—MIGRATION IMAGE DEVELOPMENT BY SPLITTING OR ABRADING SOFTENABLE LAYER. JUNE 26, 1973. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.

3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141, JAP. 0766711.

3,791,822.—REMOVAL OF BACKGROUND FROM AN IMAGED MIGRATION LAYER. FEB. 12, 1974. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.

3,795,512.—IMAGING SYSTEM. MAR. 5, 1974. ARG. 0188187, ATR. 0301340, AUS. 0429441, BEL. 0725617, BRA. 0088091, CAN. 0883747, DNK. 0131212, FRA. 1599277, GER. 1815217, GRB. 1257189, ITL. 0849328, JAP. 0686721, LXB. 0057585, MEX. 0101986, NOR. 0128084, NZL. 0154842, PTG. 0050858, SAF. 0688365, SPN. 0361650, STZ. 0523523, SWD. 0341128, VZL. 0023715.

3,798,030.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD UTILIZING POWDER PARTICLES. MAR. 19, 1974.

3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.

3,836,362.—IMAGING METHOD. SEPT. 17, 1974.

3,839,030.—MIGRATION IMAGING PROCESS WITH UNIFORM EXPOSURE BEFORE OR DURING THE SOFTENING STEP. OCT. 1, 1974. BEL. 0715790. CAN. 0890853, FRA. 1572571, GER. 1772523, GRB. 1234652, ITL. 0834777, JAP. 0620888.

3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843, BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.

3,840,397.—PARTICLE PLACING SYSTEM. OCT. 8, 1974. ARG. 0175888, ATR. 0300561, AUS. 0427473, BEL. 0724135, CAN. 0868305, DNK. 0126727, FRA. 1593258, GER. 1810079, GRB. 1254448, ITL. 0948025, JAP. 0708364, LXB. 0057367, MEX. 0107468, NOR. 0127216, NZL. 0154542, PNM. 0002048, PTG. 0050687, SAF. 0687633, SPN. 0360458, STZ. 0501251, SWD. 0341724, VZL. 0023710.

3,866,236.—IMAGING PROCESS USING VERTICAL PARTICLE MIGRATION. FEB. 11, 1975. CAN. 0936735, GRB. 1360623.

3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.

3,878,816.—IMAGING SYSTEM. APR. 22, 1975.

3,894,869.—A POLYCHROMATIC MIGRATION IMAGING SYSTEM. JULY 15, 1975.

3,901,699.—MIGRATION AND AGGLOMERATION IMAGING METHOD. AUG. 26, 1975.

3,910,475.—SYSTEM FOR ELECTRICALLY GROUNDING OR BIASING A MEMBER. OCT. 7, 1975. FRA. 7404995, ITL. 1007663.

3,912,505.—COLOR IMAGING METHOD EMPLOYING A MONOLAYER OF BEADS. OCT. 14, 1975. ARG. 0179561, AUS. 0426600, BEL. 0723097, CAN. 0890354, CHL. 0024276, FRA. 1587252, GRB. 1248744, GUA. 0002327, HOL. 0151526, ITL. 0845607, JAP. 0731223, MEX. 0107801, PNM. 0001814, PRU. 0010425, SPN. 0377583, STZ. 0526138, SWD. 0351501, URG. 0009366, VZL. 0023708.

3,917,880.—ELECTROPHOTETIC IMAGING SYSTEM. NOV. 4, 1975. GRB. 1459468.

3,918,969.—MIGRATION IMAGING METHOD EMPLOYING A UNIFORM EXPOSURE STEP. NOV. 11, 1975. ARG. 0172557, ATR. 0300565, AUS. 0430615, BEL. 0726282, CAN. 0883748, DNK. 0124046, FRA. 1598888, GER. 1817222, GRB. 1257030, ITL. 0850166, JAP. 0665999, LXB. 0057692, MEX. 0107941, NOR. 0127264, NZL. 0154930. PNM. 0001958, SAF. 0688516, SPN. 0362041, STZ. 0506822, SWD. 0340953, VZL. 0023721.

3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.

3,950,167.—IMAGING SYSTEM. APR. 13, 1976. FRA. 7432507.

3,960,555.—PROCESS-PESO WITH CONDUCTORLESS BASE. JUNE 1, 1976. BEL. 0713103, BRA. 0088021, CAN. 0890858, CHL. 0023981, FRA. 1576403, IND. 0115236, ITL. 0829694, LXB. 0055807, MEX. 0096676, PRU. 0009941, SAF. 68/2105, SPN. 0352317, URG. 0009135, VZL. 0023691.

3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.

3,967,959.—MIGRATION IMAGING SYSTEM. JULY 6, 1976.

3,970,453.—IMAGING BY SELECTIVE STRIPPING OUT AREAS OF LAYER. JULY 20, 1976.

3,975,739.—MIGRATION IMAGING SYSTEM USING SHAPED ELECTRODE. AUGUST 17, 1976.

3,976,483.—FRASING PROCESS - XDM LATENT IMAGE ERASING. AUG. 24, 1976. ARG. 0184682, AUS. 0458164, BEL. 0761130, CAN. 0946911, FRA. 7047697, GRB. 1339715, ITL. 0914071, JAP. 0770138, MEX. 0119758, VZL. 0032932.

3,979,210.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. SEPT. 7, 1976.

3,982,936.—DEFORMATION IMAGING SYSTEM. SEPT. 28, 1976.

3,982,939.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. SEPT. 28, 1976. BEL. 0773383, CAN. 0946672, FRA. 7135575, GRB. 1370146, ITL. 0938874.

3,985,560.—IMAGING SYSTEM. OCT. 12, 1976.

4,007,042.—MIGRATION IMAGING METHOD. FEB. 8, 1977.

4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1341405, JAP. 0770142.

4,014,695.—IMAGING SYSTEM. MAR. 29, 1977.

4,021,110.—PHOTOCOPYING CAMERA AND PROCESSING DEVICE. MAY 3, 1977.

4,028,101.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. JUNE 7, 1977.

4,055,418.—MIGRATION IMAGING METHOD USING AN IMAGING MEMBER EMPLOYING A SURFACE SKIN. OCT. 25, 1977.

4,081,273.—MIGRATION IMAGING METHOD. MAR. 28, 1978.

4,084,966.—IMAGING SYSTEM USING AGGLOMERABLE MIGRATION MARKING MATERIAL. APR. 18, 1978.

4,101,321.—IMAGING SYSTEM. JULY 18, 1978.

4,123,283.—SETTING ELECTRICAL LATENT IMAGES IN MIGRATION IMAGING ELEMENTS. OCT. 31, 1978. AUS. 482769. BEL. 813501. CAN. 1037546. FRA. 7412476. GRB. 1471385. ITL. 1009714. MEX. 136227.

4,135,926.—MIGRATION IMAGING PROCESS IN WHICH LATENT IMAGE IS SET. JAN. 23, 1979. AUS. 482769. BEL. 813501. CAN. 1037546. FRA. 7412476. GRB. 1471385. ITL. 1009714. MEX. 136227.

Class 31D

3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, MEX. 0106441, SPN. 0379204, SWD. 0335063, USR. 0448658. VZL. 0029780.

3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYER AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360, ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.

3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.
3,740,223.—MIGRATION IMAGING STRUCTURE. JUNE 19, 1973. BRA. 6897135, CAN. 0855151, MEX. 0100800, PNM. 0002192, PRU. 0009484, VZL. 0032425.
3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141, JAP. 0766711.
3,801,314.—IMAGING SYSTEM. APR. 2, 1974.
3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.
3,836,364.—PHOTOELECTROSOLOGRAPHIC PROCESS FOR MAKING MULTIPLE IMAGES. SEPT. 17, 1974. CAN. 0914519, GRB. 1344482, JAP. 0770140.
3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843. BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.
3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.
3,901,702.—MIGRATION IMAGING ELEMENT WITH ABSORBENT BLOTTER OVERLAYER. AUG. 26, 1975. CAN. 0945796, GRB. 1334141, JAP. 0766711.
3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.
3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.
3,975,195.—MIGRATION IMAGING SYSTEM. AUG. 17, 1976.
3,982,939.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. SEPT. 28, 1976. BEL. 0773383, CAN. 0946672, FRA. 7135575, GRB. 1370146, ITL. 0938874.
3,985,560.—IMAGING SYSTEM. OCT. 12, 1976.
3,998,635.—IMAGING SYSTEM. DEC. 21, 1976.
4,007,042.—MIGRATION IMAGING METHOD. FEB. 8, 1977.
4,009,028.—REVERSE MIGRATION IMAGING SYSTEM. FEB. 22, 1977. BEL. 0827065.
4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1341405, JAP. 0770142.
4,013,462.—MIGRATION IMAGING SYSTEM. MAR. 22, 1977.
4,040,826.—IMAGING SYSTEM OF MIGRATION MATERIAL IN SOFTENABLE LAYER. AUG. 2, 1977.
4,062,680.—IMAGING PROCESS EMPLOYING ELECTRICAL OR MAGNETIC REVERSE MIGRATION FORCE AND SOFTENABLE MAT. DEC. 13, 1977. BEL. 827065, FRA. 7509299, GRB. 1497825.
4,072,517.—MIGRATION IMAGING METHOD. FEB. 7, 1978.
4,081,273.—MIGRATION IMAGING METHOD. MAR. 28, 1978.
4,102,682.—IMAGING MEMBER. JULY 25, 1978.
4,157,259.—ERASURE IN MIGRATION IMAGING SYSTEM. JUNE 5, 1979. BEL. 827065. GRB. 1497825.

Class 31E

3,598,644.—IMAGING MEMBER FABRICATION. AUG. 10, 1971.
3,671,282.—METHOD OF MAKING AN IMAGING MEMBER. JUNE 20, 1972. BEL. 0755384, FRA. 7031999, GRB. 1326056, ITL. 0901735.
3,971,334.—COATING DEVICE. JULY 27, 1976.
4,009,028.—REVERSE MIGRATION IMAGING SYSTEM. FEB. 22, 1977. BEL. 0827065.
4,062,680.—IMAGING PROCESS EMPLOYING ELECTRICAL OR MAGNETIC REVERSE MIGRATION FORCE AND SOFTENABLE MAT. DEC. 13, 1977. BEL. 827065, FRA. 7509299, GRB. 1497825.
4,157,259.—ERASURE IN MIGRATION IMAGING SYSTEM. JUNE 5, 1979. BEL. 827065. GRB. 1497825.

Class 31F

3,520,681.—PHOTOELECTROSOLOGRAPHY. JULY 14, 1970. BRA. 0084241, CAN. 0852692, MEX. 0085656.
3,780,307.—LIQUID CRYSTALLINE COMPOSITIONS HAVING INDUCED OPTICAL ACTIVITY. DEC. 18, 1973. CAN. 1000484, GRB. 1408059.
3,909,262.—IMAGING MIGRATION MEMBER EMPLOYING A GELATIN OVERCOATING. SEPT. 30, 1975.
3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.
3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.
4,065,307.—IMAGED AGGLOMERABLE ELEMENT AND PROCESS OF IMAGING. DEC. 27, 1977. CAN. 929350, GRB. 1330518.
4,101,321.—IMAGING SYSTEM. JULY 18, 1978.

Class 31G

3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GER. 1964201, GRB. 1291848, JAP. 0726370.
3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.
3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.
3,741,757.—MIGRATION IMAGE DEVELOPMENT BY SPLITTING OR ABRADING SOFTENABLE LAYER. JUNE 26, 1973. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.
3,741,758.—MIGRATION IMAGING EMPLOYING PRESSURE NIP DEVELOPMENT. JUNE 26, 1973.
3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141. JAP. 0766711.
3,770,554.—APPARATUS FOR SPLITTING A SOFTENABLE FILM COMPRISING BITE ROLLERS. NOV. 6, 1973.
3,791,822.—REMOVAL OF BACKGROUND FROM AN IMAGED MIGRATION LAYER. FEB. 12, 1974. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.
3,836,364.—PHOTOELECTROSOLOGRAPHIC PROCESS FOR MAKING MULTIPLE IMAGES. SEPT. 17, 1974. CAN. 0914519, GRB. 1344482, JAP. 0770140.
3,876,445.—MIGRATION IMAGING BY SPLITTING A SOFTENABLE MATERIAL. APR. 8, 1975. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.
3,979,210.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. SEPT. 7, 1976.
4,014,695.—IMAGING SYSTEM. MAR. 29, 1977.
4,028,101.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. JUNE 7, 1977.
4,055,418.—MIGRATION IMAGING METHOD USING AN IMAGING MEMBER EMPLOYING A SURFACE SKIN. OCT. 25, 1977.
4,101,321.—IMAGING SYSTEM. JULY 18, 1978.

Class 31H

3,795,512.—IMAGING SYSTEM. MAR. 5, 1974. ARG. 0188187, ATR. 0301340, AUS. 0429441, BEL. 0725617, BRA. 0088091, CAN. 0883747, DNK. 0131212, FRA. 1599277. GER. 1815217, GRB. 1257189, ITL. 0849328, JAP. 0686721, LXB. 0057585, MEX. 0101986, NOR. 0128084, NZL. 0154842, PTG. 0050858, SAF. 0688365, SPN. 0361650, STZ. 0523523, SWD. 0341128, VZL. 0023715.
3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843, BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.

Class 31I

3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 31J

3,648,607.—IMAGING SYSTEM-MASTER MAKING BY BINDER PESO. MAR. 14, 1972. CAN. 0920410, GRB. 1322946, JAP. 0770136.
3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GER. 1964201, GRB. 1291848, JAP. 0726370.
3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.
3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.
3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.

3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975.
3,985,560.—IMAGING SYSTEM. OCT. 12, 1976.

Class 31K

3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.
3,894,869.—A POLYCHROMATIC MIGRATION IMAGING SYSTEM. JULY 15, 1975.
3,912,505.—COLOR IMAGING METHOD EMPLOYING A MONOLAYER OF BEADS. OCT. 14, 1975. ARG. 0179561, AUS. 0426600, BEL. 0723097, CAN. 0890354, CHL. 0024276, FRA. 1587252, GRB. 1248744, GUA. 0002327, HOL. 0151526, ITL. 0845607, JAP. 0731223, MEX. 0107801, PNM. 0001814, PRU. 0010425, SPN. 0377583, STZ. 0526138, SWD. 0351501, URG. 0009366, VZL. 0023708.
3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.
4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1431405, JAP. 0770142.

Class 31L

3,615,394.—METHOD OF FORMING A PIGMENT IMAGE FROM A PIGMENT-RESIN TONER IMAGE. OCT. 26, 1971.
3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYER AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360. ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.
4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1431405, JAP. 0770142.

Class 32

3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.
3,746,622.—COMPOSITION AND PROCESS. JULY 17, 1973. BEL. 0783439, CAN. 0986046, FRA. 7216331, MEX. 0132353, GRB. 1388725, ITL. 0965051, SAF. 7213163, STZ. 0590297.
3,774,592.—METHOD FOR PROVIDING AN IMPROVED BODY ELECTRODE ELECTRICAL CONNECTION. NOV. 27, 1973.
3,884,685.—LOW DENSITY PAPER USED IN TRANSFER ELECTROPHOTOGRAPHY. MAY 20, 1975. ARG. 0185573, ATR. 0314353, AUS. 0463544, BEL. 0768990, CAN. 9780051, CHL. 0027015, FRA. 7124553, GRB. 1353372, ITL. 0931092, MEX. 0124810, NOR. 0134805, NZL. 0164088, PNM. 0002462, SPN. 0392720, SWD. 0368995.
3,891,990.—IMAGING PROCESS USING DONOR MATERIAL. JUNE 24, 1975. GRB. 1459468.
3,946,172.—A LATCHING APPARATUS. MAR. 23, 1976. GRB. 1429530.
3,946,401.—ELECTROTHERMOGRAPHIC IMAGE PRODUCING TECHNIQUES. MAR. 23, 1976.
3,952,798.—INTERNALLY HEATED HEAT PIPE ROLLER-INTERNALLY HEATED HEAT PIPE. APR. 27, 1976. CAN. 0968341. GRB. 1368100.
3,971,950.—INDEPENDENT COMPRESSION AND POSITIONING DEVICE FOR USE IN MAMMOGRAPHY. JULY 27, 1976.
3,975,681.—ELECTRODE FOR MEASURING THICKNESS OF DIELECTRIC LAYERS ON CONDUCTIVE SUBSTRATES. AUG. 17, 1976.
3,978,342.—DUAL MODE RADIATION TRANSMITTING APPARATUS. AUG. 31, 1976.
3,997,498.—NON-SMUDGE CORRECTION FLUID. DEC. 14, 1976.
4,010,366.—MEASUREMENT OF THE MASS & CHARGE OF CHARGED CIRCUITS. MAR. 1, 1977.
4,018,953.—COATING METHOD. APR. 19, 1977.
4,020,210.—ENCAPSULATED WATER. APR. 26, 1977.
4,020,268.—AGAROSE CONTAINING AFFINITY MATRIX MATERIALS. APR. 26, 1977. BEL. 0783439, CAN. 0986046, FRA. 7216331, GRB. 1388725, ITL. 0965051, MEX. 0132353, SAF. 7213163, STZ. 0590297.
4,046,404.—CARBONLESS PAPER FOR USE IN ELECTROSTATOGRAPHIC COPIERS. SEPT. 6, 1977.
4,046,473.—PHOTORECEPTOR METHOD AND SYSTEM. SEPT. 6, 1977.
4,047,973.—RECOVERY OF SELENIUM AND SELENIUM ALLOYS BY HYDRAULIC LATHING. SEPT. 13, 1977.
4,059,353.—PHOTORECEPTOR BELT SYSTEM. NOV. 22, 1977.
4,074,000.—PRESSURE SENSITIVE ADHESIVE DRAFTING FILMS FOR USE IN ELECTROSTATOGRAPHIC COPIERS. FEB. 14, 1978.
4,085,245.—TRANSPARENCIES FOR COLOR XEROGRAPHIC COPIES. APR. 18, 1978.
4,097,267.—PURIFICATION AND REALLOYING OF ARSENIC/SELENIUM ALLOYS. JUNE 27, 1978.
4,097,273.—ARSENIC/SELENIUM RECOVERY. JUNE 27, 1978.
4,143,118.—APPARATUS AND METHOD FOR OZONE REDUCTION IN ELECTROSTATOGRAPHIC REPRODUCTION EQUIPMENT. MAR. 6, 1979.
4,161,362.—DOCUMENT CODING. JULY 17, 1979.
4,189,643.—TREATMENT OF PAPER FOR IMPROVED ELECTROSTATOGRAPHIC FUSING. FEB. 19, 1980.

Class 32A

3,132,972.—ENERGY CONVERSION CELL. MAY 12, 1964.
3,231,426.—CONTINUOUS CONCENTRATION CELL. JAN. 25, 1966.
3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.
4,175,981.—PHOTOVOLTAIC CELL COMPRISING METAL-FREE PHTHALOCYANINE. NOV. 27, 1979. SPN. 482151.
4,175,982.—PHOTOVOLTAIC CELL. NOV. 27, 1979. SPN. 482151.

Class 32B

3,150,446.—BRAZING METHOD AND COMPOSITION. SEPT. 29, 1964.
3,354,644.—LIQUID PROTECTION OF ELECTRODES. NOV. 28, 1967.
3,372,860.—CORRESPONDENCE PIECE. MAR. 12, 1968.
3,453,752.—ANSWER COMPARISON DEVICE. JULY 8, 1969.
3,483,777.—INFORMATION STORAGE AND RETRIEVAL EMPLOYING THERMAL PERFORATION OF THE RECORD MEMBER. DEC. 16, 1969. CAN. 0811566.
3,507,333.—FIRE PREVENTION SYSTEM. APR. 21, 1970. BEL. 0722599, CAN. 0910255, FRA. 1589864, GRB. 1229495, ITL. 0845253, JAP. 0752504.
3,510,210.—COMPUTER PROCESS CHARACTER ANIMATION. MAY 5, 1970.
3,552,562.—RANDOM ACCESS RETRIEVAL SYSTEM. JAN. 5, 1971.
3,577,203.—CHARACTER RECORDING AND RECOGNITION SYS. MAY 4, 1971.
3,635,789.—DRINKING OF WASTE XEROGRAPHIC COPY PAPER - REMOVAL OF XEROX TONER FROM COPY PAPER. JAN. 18, 1972.
3,645,048.—ERASER FOR VELLUM XEROGRAPHIC COPY PAPER. FEB. 29, 1972. AUS. 0449216, CAN. 0933707, GRB. 1329835.
3,647,713.—NONAGGLOMERATING BLENDING PROCESS. MAR. 7, 1972. FRA. 7004722, GRB. 1302409, JAP. 0661186.
3,648,387.—EDUCATIONAL AID. MAR. 14, 1972.
3,655,379.—PRINTING BY VAPOR PROPULSION. APR. 11, 1972. BEL. 0758057, CAN. 0929351, FRA. 7041621, GRB. 1333783, ITL. 0916693.
3,708,287.—OIL FILM IMAGING. JAN. 2, 1973.
3,713,861.—INHIBITOR DEVICE. JAN. 30, 1973. CAN. 0917701, GRB. 1338893, JAP. 0727989.
3,748,090.—EVAPORATION CRUCIBLE. JULY 24, 1973.
3,771,084.—MAGNETIC RETRIEVAL DEVICE. NOV. 6, 1973.
3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 0930693.
3,793,016.—ELECTROPHOTOGRAPHIC SHEET BINDING PROCESS. FEB. 19, 1974.
3,794,550.—SHEET BINDING. FEB. 26, 1974. CAN. 1012583, GRB. 1431286.
3,812,905.—DYNAMIC BARRIER FOR HEAT PIPE. MAY 28, 1974.
3,842,273.—CORONA GENERATOR CLEANING APPARATUS. OCT. 15, 1974. AUS. 0480142, BEL. 0817485. GRB. 1458088, SPN. 0428358.
3,845,739.—SYSTEM FOR VAPOR DEPOSITION OF THIN FILMS. NOV. 5, 1974. BEL. 0798324, GRB. 1428703.
3,861,202.—METHOD OF DETECTING PRESSURE UNIFORMITY. JAN. 21, 1975.

3,861,353.—SYSTEM FOR VAPOR DEPOSITION OF THIN FILMS. JAN. 21, 1975. BEL. 0798324, GRB. 1428703.
3,862,841.—POLYMERIZATION IMAGING BY CHARGE INJECTION FROM A PHOTOCONDUCTIVE LAYER. JAN. 28, 1975.
3,869,910.—DIAGNOSTIC TEST DEVICE FOR DEVELOPER MATERIALS. MAR. 11, 1975. CAN. 1006012, FRA. 7421111.
3,873,813.—CREDIT CARD. MAR. 25, 1975.
3,877,155.—RESPONSIVE ANSWER SYSTEM. APR. 15, 1975. CAN. 0858780, GRB. 1235941, JAP. 0688426.
3,879,275.—POLYMERIZATION. APR. 22, 1975.
3,901,591.—MECHANISM FOR COOLING PHOTOSENSITIVE MATERIALS IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. AUG. 26, 1975.
3,918,337.—CUTTING DEVICE FOR ELASTOMERIC SHEET MATERIAL. NOV. 11, 1975.
3,921,179.—FLUID PEN ASSEMBLY. NOV. 18, 1975.
3,921,896.—RESEALABLE CONTAINER. NOV. 25, 1975.
3,923,512.—IMAGING RECORDING PROCESS. DEC. 2, 1975. CAN. 1007097, GRB. 1387177.
3,929,477.—IMAGE PRODUCING TECHNIQUES OF SUPERCONDUCTING MATERIAL IN A MAGNETIC FIELD. DEC. 30, 1975.
3,944,710.—TRANSPARENCY. MAR. 16, 1976.
3,949,853.—PROPORTIONAL-SPACED CHARACTER PRINT WHEEL. APR. 13, 1976. BEL. 0825109, CAN. 1011276, GER. 7502932, STZ. 579989.
3,965,276.—POLYMERIZATION IMAGING. JUNE 22, 1976.
3,966,467.—TRANSFERRING TONER TO AN HYDROCARBON COATED SHEET. JUNE 29, 1976.
3,969,618.—ON LINE PROM HANDLING SYSTEM. JULY 13, 1976.
3,970,186.—DAMPER FOR A COMPOSITE PRINT WHEEL. JULY 20, 1976. BEL. 0825110, CAN. 1010805, STZ. 579990.
3,974,363.—PROGRAMMABLE BILLING SYSTEM. AUG. 10, 1976. BEL. 0813449, FRA. 7412151, GRB. 1448508, ITL. 1007793.
3,978,737.—CHAIN TENSIONING DEVICE. SEPT. 7, 1976.
3,989,865.—A TRANSPARENCY. NOV. 2, 1976.
3,992,511.—RECOVERY OF SELENIUM-SELENIUM RECOVERY PROCESS. NOV. 16, 1976.
4,000,460.—DIGITAL CIRCUIT MODULE TEST SYSTEM. DEC. 28, 1976.
4,013,362.—ADJUSTABLE FORMS GUIDE. MAR. 22, 1977.
4,037,706.—COMPOSITE PRINT WHEEL. JULY 26, 1977. BEL. 0825108, CAN. 1010806.
4,054,534.—VOLATILE CLEANING SOLUTION FOR MIRRORS AND LENSES. OCT. 18, 1977.
4,144,550.—REPRODUCTION MACHINE USING FIBER OPTICS COMMUNICATION SYSTEM. MAR. 13, 1979.
4,170,791.—SERIAL DATA COMMUNICATION INTERFACE SYSTEM. OCT. 9, 1979.

Class 34B

4,195,277.—MOVING PERMANENT MAGNET LIMITED MOTION ACTUATOR. MAR. 25, 1980.
4,203,680.—HIGH SPEED PRINTER WITH SELF-ADJUSTING CABLE PRELOAD MECHANISM. MAY 20, 1980.

DEFENSIVE PUBLICATIONS

PUBLISHED NOVEMBER 4, 1980

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T100,001

SUCTION DEVICE

Roy M. Frazer, Hitchin, England, assignor to Imperial Chemical Industries Limited, London, England

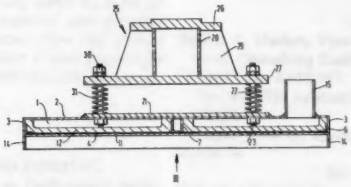
Filed Jul. 20, 1979, Ser. No. 59,447

Claims priority, application United Kingdom, Apr. 11, 1979, 12741/79; Jun. 25, 1979, 22060/79

Int. Cl.[3] **B66C** *1/02*

U.S. Cl. 294—64 R

5 Sheets Drawing. 16 Pages Specification



A suction device suitable for gripping porous sacks filled with free-flowing particulate materials is disclosed. The device comprises a vacuum chamber with a porous base and a rigid wall extending continuously around the periphery of the base on the side remote from the chamber. In use the device is placed on the sack and suction is applied until the sack and its contents rigidify as the air is drawn out from between the particles, through the porous sack. With the suction device attached to a robot arm, crane hoist or other lifting means, the rigidified sacks can be readily handled, e.g. during palletizing and depalletizing operations. The device may also be adapted for gripping filled sacks which are not naturally porous, for instance polyethylene sacks, by incorporating means, such as a knife, for piercing the sack within the area bounded by the rigid wall. For safety reasons, the piercing means preferably has associated protection which permits piercing of the sack but which shields it at other times.

DEFENSIVE PUBLICATIONS

PUBLISHED NOVEMBER 4, 1965

REISSUES

NOVEMBER 4, 1980

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 30,424

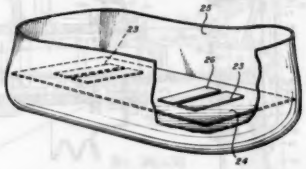
LITTER PACKAGES

Ladd L. Heldenbrand, 2 Bay Rd., South Portland, Me. 04106

Original No. 3,978,818, dated Sep. 7, 1976, Ser. No. 510,002, Sep. 27, 1974. Continuation-in-part of Ser. No. 412,700, Nov. 5, 1973, abandoned. Application for reissue Sep. 1, 1978, Ser. No. 938,959

Int. Cl.[2] **A01K** *29/00*

U.S. Cl. 119—1 **19 Claims**



13. An absorbent material package adapted for use for receiving animal litter comprising at least one container for said absorbent material, said container adapted for enclosing within the same for storage, use, and disposal said absorbent material, said container adapted for opening and for receiving litter from said animal within said absorbent material, said container further adapted for closure and/or discharge of said litter within said absorbent material.

Re. 30,425

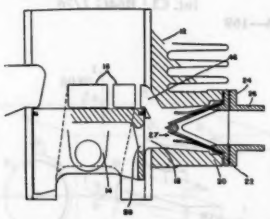
ENGINE VALVE MEANS AND PORTING

Eyvind Boyesen, Kempton, Pa., assignor to Performance Industries, Inc., Kempton, Pa.

Original No. 4,000,723, dated Jan. 4, 1977, Ser. No. 416,213, Nov. 15, 1973. Division of Ser. No. 375,065, Jun. 29, 1973, Pat. No. 3,905,340, which is a continuation-in-part of Ser. No. 282,734, Aug. 22, 1972, abandoned, and Ser. No. 361,407, May 8, 1973, abandoned. Application for reissue Sep. 24, 1979, Ser. No. 78,499

Int. Cl.[3] **F02B** *33/00*

U.S. Cl. 123—73 AA **1 Claim**



1. A variable speed two-cycle crankcase compression internal combustion engine comprising a cylinder, a piston movable in the cylinder, a fuel intake system including an intake tract at one side of the cylinder and having reed valve means for controlling the flow through the intake tract, and said intake system including porting in the cylinder wall and in the piston located at the same side of the cylinder as the intake tract, *the intake tract, the reed valve means and the intake system porting in the cylinder wall all being located to confront the bottom dead center position of the piston,* the piston and the cylinder and piston porting being located and proportioned axially of the cylinder to provide flow channel means of substantial cross sectional flow area between the intake tract and the crankcase of the engine throughout the entire cycle of the engine including the bottom dead center position of the piston and thereby provide uninterrupted fuel intake during the stroke of the piston from bottom dead center to top dead center position, *the piston porting including at least one port opening and every such piston port opening being positioned axially of the piston so that substantially the entire flow area of the piston port opening communicates with the cylinder porting in bottom dead center position of the piston,* and a fuel transfer system for transferring fuel from the crankcase of the engine to the combustion side of the piston including a transfer passage communicating with the crankcase and having a transfer port through the cylinder wall and axially positioned to be closed by the piston in the region of top dead center position of the piston, said transfer port being offset from the cylinder and piston intake porting circumferentially of the cylinder so that a fuel flow path is provided in the transfer system from the crankcase to the cylinder at the combustion side of the piston independently of the intake tract.

Re. 30,426

I.C. ENGINES

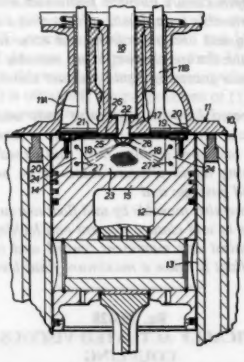
Robert A. Haslett, Shoreham-by-Sea, England, assignor to Ricardo Consulting Engineers Limited, Sussex, England

Original No. 4,092,967, dated Jun. 6, 1978, Ser. No. 730,071, Oct. 6, 1976. Application for reissue Feb. 28, 1979, Ser. No. 15,884

Claims priority, application United Kingdom, Jun. 10, 1976, 24156/76

Int. Cl.[2] **F02B** *75/12*

U.S. Cl. 123—143 B **14 Claims**



1. An internal combustion engine of reciprocating-piston type having a cylinder with a combustion chamber, and a piston with a crown in the cylinder, the major portion of the volume of said combustion chamber being afforded by a recess formed in the crown of the piston, the recess *having an open mouth at its upper side and* having a bottom, a catalytic element *of foraminous sheet construction through whose thickness gas can flow freely, said element being carried* in the cylinder [carried] by the piston, [and] *said catalytic element being effective without additional ignition means to initiate combustion of a fuel vapour and air mixture and having a cover portion extending crosswise of said recess, said cover portion being* mounted in a position overlying *and spaced from* the bottom of said recess

and enclosing a space beneath it within the recess, and said element having at least one portion depending from said covered portion towards the bottom of said recess, means for introducing combustion air into the combustion chamber, and means for injecting fuel into *said space enclosed by said cover portion in* said recess, when the piston is at about its top-dead-centre position, *in a manner* [direction] such that substantially the whole of the injected fuel will *travel into* contact *with* the surface of the catalytic element to initiate its combustion.

Re. 30,427

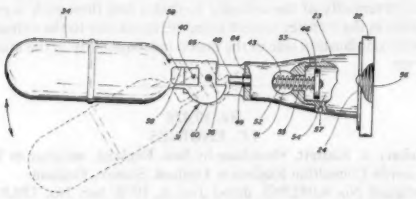
MAXIMUM LIQUID LEVEL CONTROL VALVE

Harley D. Brown, P.O. Box 844, Bedford, Ind. 47421, and Harley Brown, Bedford, Ind., assignors to Harley D. Brown, Bedford, Ind.

Original No. 4,142,552, dated Mar. 6, 1979, Ser. No. 778,371, Mar. 17, 1977. Application for reissue May 25, 1979, Ser. No. 42,365

Int. Cl.[2] F16K *33/18, 33/00*

U.S. Cl. 137—446 **11 Claims**



11. A valve for limiting the flow of liquid into a tank which comprises:

a valve body including a valve seat and a passage for liquid to flow therethrough, said valve body being mountable to the side wall of a tank;

a float pivotally attached to said valve body;

a normally open closure element positioned within said valve body and movable toward said valve seat to a closed position against said seat and away from said valve seat to an open position, said closure element being movable to said closed position under incoming liquid pressure thereby closing said passage;

a spring disposed between said valve body and said closure element, said spring being operable to return said closure element to said open position from said closed position once said incoming liquid pressure ceases to be present thereby opening said passage; and

a single cam member movable by said float to a suitable orientation relative to said closure element and locking said closure element against any movement toward said closed position when said float is below a maximum fluid level.

Re. 30,428

MAGNETICALLY ACTUATED VISCOUS FLUID COUPLING

Rodney H. Detty, Marshall, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Original No. 4,056,178, dated Nov. 1, 1977, Ser. No. 681,106, Apr. 28, 1976. Application for reissue Mar. 14, 1979, Ser. No. 20,282

Int. Cl.[3] F16D *35/00, 43/25*

U.S. Cl. 192—58 B **29 Claims**

19. A viscous fluid clutch comprising:

a first member rotatable about an axis;

a second member rotatably disposed on said axis relative to said first member;

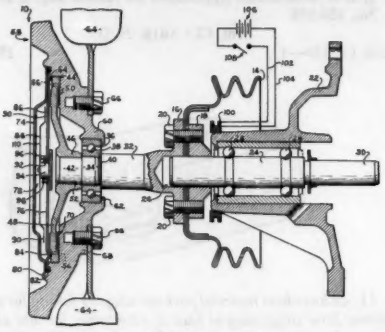
shear surfaces disposed on said first and second members and forming an operating chamber therebetween;

a fluid storage chamber adjacent said operating chamber;

a shaft made of a magnetic material and mounted on one of said members for rotation about said axis;

means for selectively inducing a magnetic field in said shaft;

valve means effecting selective communication between said storage chamber and said operating chamber and including a valve member, including an armature made of a magnetic material and located adjacent said shaft, movable in response to the induction of said magnetic field in said shaft from a first position to a second position, one of said positions providing communication between said storage chamber and said



operating chamber and the other of said positions blocking such communication;

fluid means disposed within said storage chamber and being selectively displaced into said operating chamber when said valve member is in said one position to provide in said operating chamber a medium to transmit rotational movement from one of said members to the other of said members; and

pump means in said operating chamber to displace said fluid means from said operating chamber to said storage chamber.

Re. 30,429

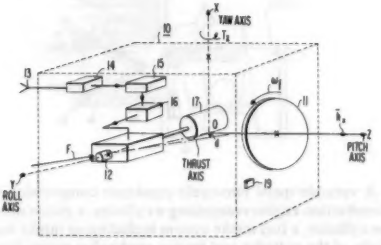
MINIMIZATION OF RESIDUAL SPACECRAFT NUTATION DUE TO DISTURBING TORQUES

Kevin J. Phillips, Hightstown, N.J., assignor to RCA Corporation, New York, N.Y.

Original No. 3,997,137, dated Dec. 14, 1976, Ser. No. 423,441, Dec. 10, 1973. Application for reissue Dec. 12, 1978, Ser. No. 968,799

Int. Cl.[3] B64G *1/26*

U.S. Cl. 244—169 **14 Claims**



8. A method for reducing nutation caused by a thrust force not passing through the center of gravity of a spacecraft of the dual spin type having a spin axis and a characteristic nutation period and further having a platform despun from a spinning member, comprising the steps of:

transmitting signals to spacecraft receiver means causing a receiver means output signal;

coupling said receiver output signal to logic circuit means causing a logic circuit means output signal;

activating a force generating means mounted on said platform for producing said thrust force a first time for a predetermined operating period T_1 in response to said logic circuit output signal, said predetermined operating period determined by said logic means to be a predetermined portion of said nutation period of said spacecraft;

deactivating said force generating means for a waiting period T_w in response to said logic circuit means output signal at the end of said predetermined operating period T_1;

activating said force generating means automatically for producing said thrust force a second time in response to said logic circuit means output signal for said predetermined operating period T_1 after said waiting period T_w, wherein said waiting period, T_w, is determined by:

$$T_w = \frac{2}{\omega_n} - \tan^{-1}\frac{1+\cos\omega_n T_1}{\sin\omega_n T_1}$$

where ω_n is the spacecraft nutation frequency and T_1 is said force generating means operating period.

Re. 30,430
CATALYST TREATMENT

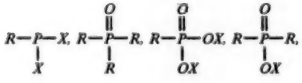
Ralph O. Kerr, Bloomington, Ind., assignor to Denka Chemical Corporation, Houston, Tex.

Original No. 4,006,168, dated Feb. 1, 1977, Ser. No. 563,740, Mar. 31, 1975. Application for reissue Feb. 26, 1979, Ser. No. 14,833

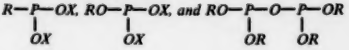
Int. Cl.³ C07D *307/60*

U.S. Cl. 260—346.75 **13 Claims**

1. In a process for the vapor phase oxidation of C_4 to C_8 hydrocarbons to dicarboxylic [acids] *anhydrides* wherein said hydrocarbon is contacted with a vanadium-molybdenum-oxygen catalyst wherein said catalyst gradually decreases in activity, the improvement comprising adding to said catalyst, after said decrease in activity, *a compound of a phosphorus halide or an organo-phosphorus compound selected from the group consisting of*



-continued



wherein R is phenyl or an alkyl radical of one to 6 carbon atoms and X is H or R, and thereafter adding to said catalyst a volatilized compound of molybdenum, nickel, cobalt, manganese, uranium or mixtures thereof.

Re. 30,431
TOUGHENED MERCAPTOSILOXANE MODIFIED EMULSION POLYMERIZED VINYLIC POLYMERS

James R. Falender, Sanford; Claudia M. Mettler, and John C. Saam, both of Midland, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Original No. 4,071,577, dated Jan. 31, 1978, Ser. No. 679,595, Apr. 23, 1976. Application for reissue Aug. 21, 1978, Ser. No. 935,447

Int. Cl.³ C08L *35/04, 25/12, 81/00*

U.S. Cl. 525—479 **4 Claims**

1. A thermoplastic vinylic polymer having improved impact strength made by the method which comprises polymerizing (1) [a vinylic monomer selected from the group consisting of styrenic monomers, methyl methacrylate,] mixtures of major amounts of styrenic monomers and minor amounts of [monomers selected from the group consisting of acrylic monomers, alpha-methylstyrene, vinyl halide monomers, vinyl acetate, butadiene monomers and] acrylonitrile monomers [and mixtures of major amounts of methyl methacrylate and minor amounts of monomers selected from the group consisting of other acrylic monomers, styrenic monomers, butadiene monomers, vinyl halide monomers, vinyl acetate, alpha-methylstyrene, and acrylonitrile monomers,] in an aqueous emulsion of (2) a copolymer of dimethylsiloxane, from 0.3 to 10 mol percent mercaptosiloxane of the unit formula $HSR'SiR_nO_{3-n/2}$ in which R′ is a divalent or trivalent saturated aliphatic hydrocarbon radical of 1 to 18 carbon atoms, two valences of R′ being attached to the same silicon atom when R′ is trivalent, R is a monovalent hydrocarbon radical free of aliphatic unsaturation of 1 to 6 carbon atoms and n is 0 to 2 and sufficient $R''SiO_{3/2}$ or SiO_2 units to give a percent volume swell of the copolymer of 500 to 1,600 percent in benzene, R″ being of the group HSR′— and R groups, in the presence of a free radical generator, whereby a thermoplastic matrix having dispersed therein particles of (2) is obtained, the proportions of (1) and (2) being from 1 to 40 percent by weight (2) based on the combined weights of (1) and (2).

PLANT PATENTS

GRANTED NOVEMBER 4, 1980

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,607

PLANT OF THE BROMELIACEAE FAMILY

Barnell L. Cobia, P. O. Box 1307, Winter Garden, Fla. 32707

Filed May 7, 1979, Ser. No. 36,542

Int. Cl.³ A01H *5/12*

U.S. Cl. Plt.—88 **1 Claim**

1. The new and distinct plant variety of the Bromeliaceae family substantially as shown and described herein.

4,608

Patent Not Issued For This Number

PATENTS

GRANTED NOV. 4, 1980

ERRATA

For CLASS	See PATENT NO.
474–080	4,231,264
474–152	4,231,265
440–043	4,231,315
440–086	4,231,316
440–050	4,231,317
493–426	4,231,559
493–029	4,231,560
414–343	4,231,708
414–458	4,231,709
414–475	4,231,710
430–059	4,231,799
564–073	4,231,960
564–065	4,231,961
564–272	4,231,962
564–443	4,231,963
564–305	4,231,964
568–327	4,231,965
568–396	4,231,966
568–433	4,231,967
570–109	4,231,968
570–223	4,231,969
370–024	4,232,188
370–097	4,232,197
370–079	4,232,266
370–029	4,232,318

PATENTS

GRANTED NOV. 6, 1900

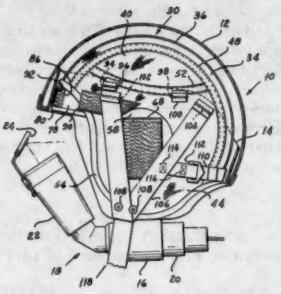
INDEX

PATENTS

GRANTED NOVEMBER 4, 1980

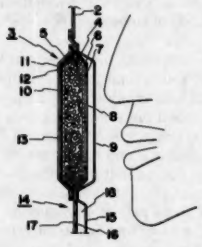
GENERAL AND MECHANICAL

4,231,117
HELMET ASSEMBLY FOR ACCURATELY POSITIONING VISUAL DISPLAY SYSTEM
Jackson A. Aileo, Carbondale, Pa., assignor to Gentex Corporation, Carbondale, Pa.
Filed Jan. 15, 1979, Ser. No. 3,195
Int. Cl.[2] A42B *3/00*
U.S. Cl. 2—6 **9 Claims**



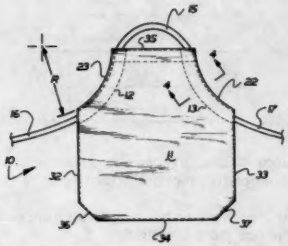
7. A helmet assembly for use with a portable visual display unit including in combination a rigid outer shell, an inner subassembly adapted to fit relatively closely over the wearer's head, said outer shell and said inner subassembly having portions overlying the forehead of the wearer, means for mounting said display unit on said outer shell, and means for adjustably securing said outer shell to said inner subassembly along said portions to position said visual display unit in a predetermined desired relationship relative to the eye of the wearer.

4,231,118
HEAD AND FACE PROTECTING HOOD
Yoshimasa Nakagawa, Urawa, Japan
Filed Apr. 10, 1979, Ser. No. 28,799
Claims priority, application Japan, Apr. 10, 1978, 53-46922; Apr. 10, 1978, 53-46923
Int. Cl.[3] A42B *1/04*; A62C *39/00*; A62B *23/00*
U.S. Cl. 2—7 **5 Claims**



1. A head and face protecting hood comprising:
an outer cover body made up of a front wall and a rear wall, said walls being attached to each other at edges thereof except at the bottom edges through which the wearer's head fits for putting the hood on;
said front and rear walls having an outer layer which is made of a laminate of non-flammable polyvinyl chloride sheet and non-flammable fiber sheet and having an inner layer spaced from said outer layer attached to the edges of said front and rear wall outer layer, said inner layer being made of adiabatic material and extending so as to cover the whole head and face of the wearer; and
an eyepiece positioned in front of the eyes which is secured to said front wall of said cover body, said front wall having an opening for fitting said eyepiece being made of a non-flammable transparent polyvinyl chloride material for allowing vision therethrough.

4,231,119
ADJUSTABLE APRON OF VINYL LAMINATE
Daniel P. Quinn, 4802 Krueger Ave., Parma, Ohio 44134
Filed Aug. 22, 1979, Ser. No. 68,506
Int. Cl.[3] A41B *13/10*
U.S. Cl. 2—48 **1 Claim**



1. An adjustable apron to fit a person chosen from a wide range of body shapes and sizes, said apron comprising,
(a) a body member of soft, flexible vinyl laminate of poly(vinyl chloride) bonded to a woven cotton fabric,
(b) two separate identical quarter-ring-shaped arm cut-out strips of said vinyl laminate,
(c) a single flat continuous tape snugly and slidably held in said apron so as to be frictionally engaged therein for arcuate movement only upon exertion of a force, said tape forming an adjustable neck loop and waist-tying ends,
(d) two arcuate hems to permit support of said apron on the person's pelvic region, each hem being formed by sewing one of said arm cut-out strips to said body member on opposite sides thereof, said hem including
(i) an arcuate hidden reinforcing seam having a radius from about 25 cm to about 40 cm, said seam being formed with a first top-stitch which compresses vinyl surfaces of said body member and an arm cut-out strip in abutting relationship between their woven cotton fabric surfaces so as to hinder propagation of punctures caused by said first top-stitch,
(ii) a second top-stitch fastening said body member and said arm cut-out strip and compressing their cotton fabric surfaces in abutting relationship between their vinyl surfaces, and
(iii) a third top-stitch which secures said hidden reinforcing seam tightly between said arm cut-out strip and said body member, so as to form
(iv) an edge-rubbing surface against which the upper edge of said tape rubs when the apron is adjusted for use, and against which edge-rubbing surface the tape is stressed when the apron is in use,
whereby, the apron is fixedly removably secured on the body of its wearer by tying a knot in said waist-tying ends so as to tension said tape without forming stress creases in said body member in the areas where said tape exits said hems.

4,231,120

ENDOPROSTHETIC ORTHOPAEDIC DEVICES

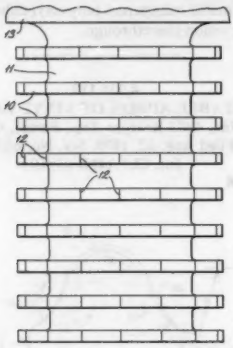
William H. Day, London, England, assignor to National Research Development Corporation, London, England

Filed Sep. 18, 1978, Ser. No. 943,648

Claims priority, application United Kingdom, Sep. 22, 1977, 39553/77

Int. Cl.³ A61F *1/24*

U.S. Cl. 3—1.91 **7 Claims**



1. An endoprosthetic orthopaedic component of non-rigid synthetic thermoplastic material, comprising:

a body;

at least one elongate member projecting from said body and formed in one piece therewith;

said member having a generally cylindrical solid core portion with a relieved structure over a major proportion of its longitudinal extent;

said structure being defined by a plurality of like fins circumscribing said core portion;

said fins being successively spaced from one another by a distance longitudinally of said core portion which is greater than the individual thicknesses of the respective fins in the same direction;

each said fin being subdivided into a plurality of angularly discrete portions; and

each said fin having a radial height from said core portion greater than said thickness.

4,231,121

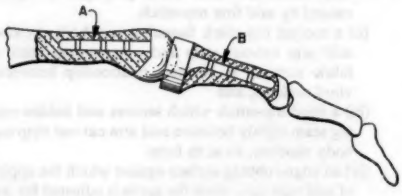
METACARPAL-PHALANGEAL PROSTHESIS

Frank M. Lewis, Cordova, Tenn., assignor to Wright Dow Corning, Arlington, Tenn.

Filed Jul. 5, 1979, Ser. No. 55,054

Int. Cl.³ A61F *1/24*

U.S. Cl. 3—1.91 **1 Claim**



1. An artificial joint for implantation into the living body to provide a total joint, consisting of:

(a) a first component commprising:

i. a stem for intramedullary implantation into a bone,

ii. a head formed integrally with the stem and transversely disposed thereto at one end thereof and being of cylindrical configuration with its axis parallel to the axis of the stem and laterally offset with respect thereto in one aspect and aligned therewith in an aspect turned 90°,

iii. the outer surface of the head having a concentrically positioned concave depression therein of part-spherical shape, and

(b) a second component comprising:

i. a head formed integrally with a stem and being defined by:

ii. a part-spherical convex outer surface and two flat surfaces which form a dihedral angle of 225°, and

iii. a stem for intramedullary implantation into a bone formed integrally with the head and extending at right angles from one of the surfaces,

iiii. the axis of the stem being within a plane bisecting the surface to which the stem is connected and being displaced laterally from a plane which includes the apex of the dihedral angle and is parallel to the stem,

(c) the concave part-spherical surface of the first component and the convex part-spherical surface of the second component having the same radii and forming complementary articulating surfaces on implantation.

4,231,122

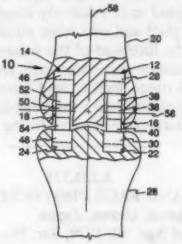
KNEE JOINT PROSTHESIS

James B. Koeneman, Erie, Pa., assignor to Lord Corporation, Erie, Pa.

Filed Nov. 16, 1977, Ser. No. 852,111

Int. Cl.³ A61F *1/03*

U.S. Cl. 3—1.911 **5 Claims**



1. A joint prosthesis for use in replacement of a skeletal knee joint which joint permits movement of adjacent body members in flexion about a flexion axis and in rotation relative to each other about an axis extending longitudinally through at least one of the body members perpendicular to said flexion axis, comprising:

first joint component means for connection with one body member, and second joint component means for connection with said adjacent body member;

first and second pivot members, said first and second pivot members being spaced apart on opposite sides of said longitudinal axis and disposed between said first and second joint component means; and

securing means including a pair of first bodies of elastomeric material and a pair of second bodies of elastomeric material, said pair of first bodies of elastomeric material being disposed between and attaching to said first joint component means and respective ones of said pivot members, said pair of second bodies of elastomeric material being disposed between and attaching to said second joint component means and respective ones of said pivot members, said first pair of bodies of elastomeric material and said second pair of bodies of elastomeric material being spaced apart and suspending said pivot members between said first and second joint component means to permit motion of said first and second joint component means relative to each other about said flexion axis in response to flexion

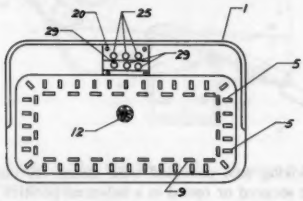
movement of said adjacent body members, said pivot members pivoting about axes parallel to said longitudinal axis and independently rotating in opposite directions about axes in a plane normal to said longitudinal axis in response to rotational movement of said adjacent body members relative to each other, said pivot members cooperating with said first and second bodies of elastomeric material in simulating the operation of a knee joint in the human body.

4,231,123

ENAMELLED BASIN STRUCTURE

Yao-Hui Cheng, No. 1, Alley 1, lane 774 Kuo Hwa St., Chiyi, Taiwan

Filed Dec. 28, 1978, Ser. No. 974,114
Int. Cl.³ A47K 1/04; E03C 1/18
U.S. Cl. 4—651 **6 Claims**



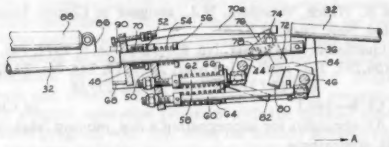
1. An enamelled bowl shaped basin having a drain at the bottom connected to a drain line and a continuous external supply of water comprising a first passageway integrally enclosed within the rim portion of the basin connected to the external water supply, a first row of holes spaced around the inside of said basin near the rim communicating with said first passageway, a second passageway integrally enclosed within the rim portion of the basin connected to the drain line, a second row of holes spaced around the inside of said basin above said first row of holes and communicating with said second passageway, at least one water supply line connected to said first passageway, valve means in said water supply line for controlling the flow of water therein, and push button means connected to said valve means for selectively positioning the valve means.

4,231,124

HOSPITAL BEDS

John M. Croxton, Birmingham, England, assignor to J. Nesbit-Evans & Co. Ltd., Wednesbury, England

Filed Mar. 14, 1979, Ser. No. 20,271
Claims priority, application United Kingdom, Apr. 1, 1978, 12843/78
Int. Cl.³ A61G 7/00, 7/10
U.S. Cl. 5—63 **6 Claims**



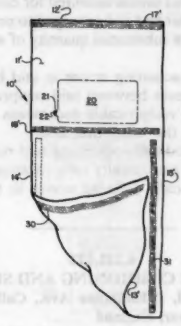
4. A hopsital bed or the like comprising a base, a top, and two sets of swinging links disposed between the base and the top, said links being coupled to opposite ends of a main shaft of a mechanical jack system including said main shaft extending through a pair of first and second canting plates of which the first plate is arranged to be displaced with the main shaft by a first operating member when said first plate is in wedging position on said main shaft to displace said shaft in one direction and the second plate is arranged to wedge the shaft against return movement, said second plate being arranged to be returned to a non-wedging position by a second operating member coupled to the second plate when return movement is required, characterised in that said second operating member is also coupled to said first plate so that the first plate is displaced at least to the wedging position on the main shaft when the second plate is to be released ready for the return movement, movement of the main shaft in said one direction raising the top of the bed relative to said base and movement of the main shaft in said return movement lowering the top of the bed relative to said base.

4,231,125

BEACH TOWEL FOR USE WITH A PILLOW

Joseph F. Tittl, 1405 Eastcrest Dr., Apt. 201, Charlotte, N.C. 28205

Filed Jun. 27, 1979, Ser. No. 52,565
Int. Cl.³ A47G 9/06
U.S. Cl. 5—419 **2 Claims**



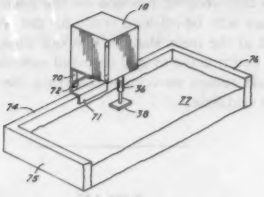
1. A beach towel for use with a pillow, and characterized by simplicity and economy of construction, and the use of elements not susceptible to corrosion by salt or damage from sand, comprising:

(a) an elongate, substantially rectangular fabric piece defining opposing, laterally extending top and bottom end edges and opposing, longitudinally extending side edges;

(b) a pair of longitudinaly space-apart and laterally extending attachment members secured to said fabric piece proximate the top end thereof for permitting the top end of said fabric piece to be folded over itself and releasably attached in such position to form a tube for enclosing a pillow, one of said attachment members comprising a patch having numerous rows of hooklike projections, and the other of said pair of attachment members comprising a patch of loose, fibrous non-woven material for releasably interlocking with said hook-like projections; and

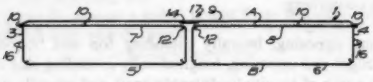
(c) means for releasably attaching a plurality of said towels together side to side to form an oversized towel for use by several persons and to aid in preventing blowing of said towels by wind, said means comprising a patch of hook-like projections secured to one face of said fabric piece closely adjacent one side edge thereof, and a patch of loose, fibrous non-woven material secured to the other face of said fabric piece closely adjacent the other side edge thereof, whereby one of said towels may be releasably secured to another of said towels by overlapping their ajoining side edges and releasably interlocking said patch of hook-like projections with said patch of loose, fibrous non-woven material.

4,231,126
WATER BED WAVE GENERATOR
Earl Hurkett, 1201 W. 92nd #309, Denver, Colo. 80221
Filed Jan. 19, 1979, Ser. No. 4,685
Int. Cl.³ A47C *27/08;* A61H *1/00*
U.S. Cl. 5—451 **8 Claims**



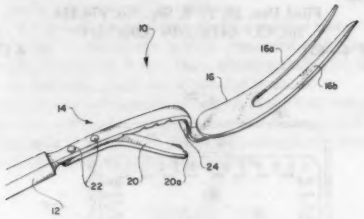
1. A wave generator for water beds, comprising:
(a) housing means;
(b) mounting means to mount the housing to the frame of a water bed, said mounting means adapted to vary the height of the housing means relative to the top surface of a water bed;
(c) reciprocable pad means mounted for contact with the top surface of a water bed and arranged to press into the water bed to displace a substantial quantity of water in the water bed;
(d) reciprocating actuating means in said housing;
(e) connecting means between said reciprocating actuating means and said reciprocable pad means for pressing said pad means into the water bed; and,
(f) means for periodically operating said reciprocating actuating means for periodically reciprocating said pad means, thereby periodically forming waves in the water of said water bed.

4,231,127
FOLDABLE CUSHIONING AND SUPPORT
Abraham D. Bendell, 1 Kirkstone Ave., Cullercoats, Whitley Bay, Tyne and Wear, England
Filed Aug. 17, 1978, Ser. No. 934,473
Int. Cl.² A47C *23/00*
U.S. Cl. 5—462 **9 Claims**



1. Foldable cushioning comprising:
a pair of separate cushioning members, each cushioning member having opposed faces and peripheral side regions extending between said opposed faces, said cushioning members being disposed side by side with respective portions of said side regions being disposed adjacent to and extending substantially parallel to each other;
a pair of border strips, each border strip extending around and over a respective cushioning member side region and having first and second edges;
a pair of inner skins, each inner skin overlying one face of a respective cushioning member and being secured to the second edge of a respective border strip;
a pair of cover sheets, each cover sheet overlying the other face of a respective cushioning member and being secured to the first edge of a respective border strip; and
a further largest cover sheet overlying both of said inner skins, said further cover sheet having a peripheral edge which is secured to at least a portion of the second edges of the respective border strips in a manner such that a pouch is defined between said further cover sheet and each of said inner skins and such that the portion of said further cover sheet extending between the adjacent portions of the side regions of said cushioning members comprises a band-like portion constituting a hinge-like fold zone.

4,231,128
COOKING UTENSIL WITH INTEGRALLY FORMED POT ATTACHING MEANS
Donald E. James, P.O. Box 64223, Fayetteville, N.C. 28306
Filed Jan. 29, 1979, Ser. No. 7,772
Int. Cl.³ B25F *1/00*
U.S. Cl. 7—112 **10 Claims**

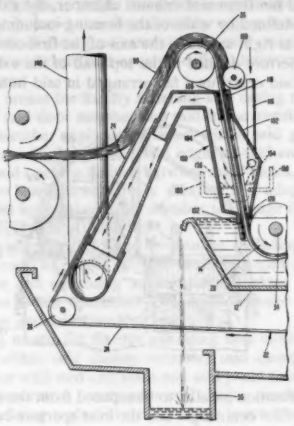


1. A cooking tool provided with means for enabling the same to be secured or rested in a balanced position about the upper edge of the wall structure of a pot or pan, said cooking tool comprising a handle end, a working end and an intermediate shank portion extending between said handle end and said working end; attaching means formed about said intermediate shank portion for enabling said cooking tool to be secured about the upper edge of a pan or pot's retaining wall, said attaching means including at least one transverse groove formed across one side of said intermediate shank portion; a holding member having one end secured to said intermediate shank portion and extending therefrom to where a terminal end thereof terminates in spaced apart relationship with said intermediate shank portion so as to define an open area between the intermediate shank portion of said cooking tool and said holding member; and means projecting downwardly from said intermediate shank portion, forwardly of the at least one transverse groove, towards said terminal end of said holding member wherein said downwardly projecting means, said holding member, and said intermediate shank portion define a receiving area for receiving the upper edge of a pot or pan's retaining wall and wherein said holding member is cooperable with either the at least one groove or said downwardly projecting means to secure said cooking tool about the upper edge of a respective pot or pan's retaining wall.

4,231,129
APPARATUS AND METHOD FOR IMPREGNATING A DRY FIBER BATT
Allen R. Winch, Westfield, N.J., assignor to Cotton, Incorporated, New York, N.Y.
Continuation-in-part of Ser. No. 859,167, Dec. 9, 1977, Pat. No. 4,158,297. This application Mar. 28, 1979, Ser. No. 24,533
Int. Cl.³ D06B *5/08, 21/00, 23/18*
U.S. Cl. 8—149.1 **24 Claims**

1. An apparatus for impregnating a dry, moving fabric with liquid, comprising:
tank means for containing a supply of the liquid;
means for conveying the fabric into and out of the tank means; and
purging means for urging a condensable gas through the dry fabric immediately prior to entry of the fabric into the supply of the liquid, the purging means including both first chamber means for communicating the condensable gas with one side of the dry fabric and means for providing a

pressure differential through the fabric, said means for providing the pressure differential including means for



substantially sealing the dry fabric with respect to the first chamber means.

4,231,130

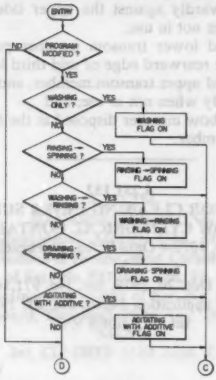
AUTOMATIC WASHING MACHINE AND METHOD FOR OPERATING THE SAME

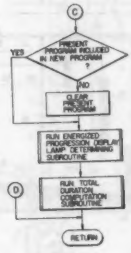
Hideyuki Tobita, Hitachi, and Toshio Mori, Katsuta, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 16, 1979, Ser. No. 21,187
Claims priority, application Japan, Mar. 20, 1978, 53-30949
Int. Cl.³ D06F *33/02*
U.S. Cl. 8—159 **5 Claims**

1. An automatic washing machine comprising a cabinet, an outer tub supported within said cabinet, a spinning and washing perforated tub supported rotatably within said outer tub, a rotatable agitator agitating articles to be washed together with water filled within said spinning and washing tub, drive means for driving said rotatable agitator during a washing operation and a rinsing operation and driving said spinning and washing tub during a spinning operation, a water feed system feeding water into said outer tub, a water drain system draining water from within said outer tub, memory means for programming and storing the operating durations and the operating sequence of said drive means, said feed system and/or said drain system, means for selecting a desired operation program from those stored in said memory means, and control means for controlling said drive means, said feed system and/or said drain system in accordance with the operation program selected by said selecting means thereby carrying out the programmed sequence of the washing, rinsing and spinning operations, said selecting means including operation selector switch means for selecting the combination of the washing operation, the rinsing operation and/or the spinning operation in the selected operation program as desired and also for making a mid-course modification of the already selected operation program, wherein said control means comprises means for comparing a newly selected operation program with the already selected operation program whereby, when the already selected operation program includes an operation included in the newly selected operation program, the operation in the already selected program corresponding to that included in the newly selected operation program is only continuously carried out for the predetermined run duration.

4. A method for operating an automatic washing machine which is provided with operation selector switch means for selecting the combination of a washing operation, a rinsing operation and/or a spinning operation in a selected operation program as desired and also for making a mid-course modification of the already selected operation program, said method comprising the step of comparing a newly selected operation program with the already selected operation program whereby, when the already selected operation program includes an operation included in the newly selected operation program, the operation in the already selected operation program corresponding to that included in the newly selected operation program is only continuously carried out for the predetermined run duration.



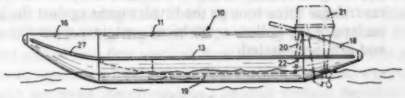


4,231,131

INFLATABLE HIGH SPEED BOAT

Eldon L. Young, 3236 Wesleyan Dr., Anchorage, Ak. 99504

Filed Oct. 2, 1978, Ser. No. 947,955
Int. Cl.³ B63B *7/08*
U.S. Cl. 9—2 C **7 Claims**



1. A collapsible inflatable boat for high-speed travel, comprising in combination:

a pair of inflatable tubes arranged in parallel, spaced-apart relationship;

a floor member connecting said tubes and disposed so as to extend above the water when said tubes are on a body of water, said floor member having permanently attached, rigid, spaced-apart support members extending laterally of said floor member between said pair of tubes;

a third inflatable member permanently attached to the underside of said floor member for support and extending longitudinally of the boat to the rearward edge of said floor member;

a rigid, hinged upper transom member permanently attached to the rearward edge of said floor member and which is foldable forwardly against the upper side of said floor member when not in use;

A rigid, hinged lower transom member permanently attached to the rearward edge of said third inflatable member below said upper transom member, and which is foldable forwardly when not in use; and

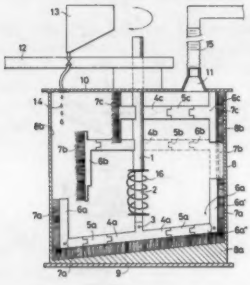
a leading edge bow member disposed at the forward end of said floor member.

4,231,132

APPARATUS FOR CLEANING INNER SURFACES OF HOLLOW CYLINDRICAL CONTAINER

Makoto Watanabe, 1070-4 Oaza Shiba, Kawaguchi Saitama-ken, Japan (332)

Filed Dec. 20, 1978, Ser. No. 971,167
Claims priority, application Japan, Jul. 31, 1978, 53-92473
Int. Cl.³ B08B 9/08
U.S. Cl. 15—56 **9 Claims**



1. An apparatus, for washing and polishing inner surfaces of a hollow cylindrical container, comprising:

(i) a support

(ii) a shaft carried in rotatable manner by said support, said shaft having its axis of rotation vertical when in use,

(iii) drive means coupled to said shaft for rotating it,

(iv) at least one arm secured at one of its ends to said shaft for rotation therewith,

(v) brush means carried at the other end of said arm for contacting the inner surface of the hollow cylindrical container, said arm including along its length a plurality of arm portions coupled serially end to end by pivot means, the axis of each said pivot means being parallel to the axis of said shaft, whereby the radial extent of each said arm is variable by relative pivoting of adjacent coupled arm portions and each arm portion is supported against gravity, and the radial extent of said arm may be varied by centrifugal force to urge the brush means against the inner surface of the hollow cylindrical container when the shaft and arm are rotated.

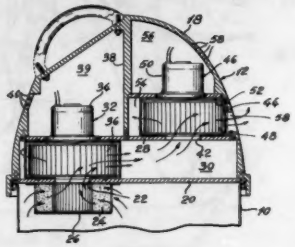
4,231,133

WET VACUUM MACHINE

Miroslav Probost, Pincourt, Canada, assignor to Deep Steam Extraction (1974) Ltd., Montreal, Canada

Filed Mar. 19, 1979, Ser. No. 21,340
Int. Cl.³ A47L 9/22
U.S. Cl. 15—300 A **6 Claims**

1. A suction power unit for use with a wet vacuum machine comprising a housing, a first electric motor-centrifugal fan arrangement provided in the housing, the first centrifugal fan having an axis of rotation, inlet means communicating axially with the fan, an exhaust chamber defined radially of the centrifugal fan, means hermetically isolating the motor of said first centrifugal fan from said exhaust chamber, the exhaust chamber being defined by walls of the housing including a top wall in a plane at right angles to the axis of the first centrifugal fan, an inlet aperture defined in the top wall of the exhaust chamber, a second centrifugal fan arranged in said housing having



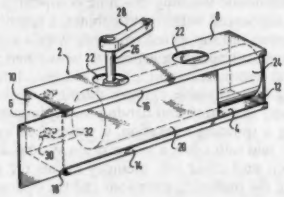
an axis of rotation parallel to but spaced from the axis of rotation of the first centrifugal fan, the inlet aperture communicating axially with the second centrifugal fan, a second exhaust chamber formed radially of the second centrifugal fan, and means hermetically isolating the motor of the second centrifugal fan from the second exhaust chamber, and exhaust ports communicating said second chamber with the atmosphere.

4,231,134

AUTOMATIC DOOR CLOSING ARRANGEMENT

Hans Schoker, Vaduz, Liechtenstein, assignor to Casma Di V. Marinoni & Figli, Magenta, Italy

Filed Apr. 20, 1978, Ser. No. 898,140
Int. Cl.² E05F 3/00
U.S. Cl. 16—49 **2 Claims**



1. An automatic door closing assembly particularly adapted to be operatively mounted between a door member and a frame member defining an aperture to be opened and closed by said door member and operating to automatically actuate said door member to the closed position, said assembly being structured to enable selective connection thereof in operative engagement with door members irrespective of the side thereof upon which said door member is hinged to said frame member, said assembly comprising:

an elongated trilateral casing member formed of sheet material having first, second and third integrally joined angularly offset longitudinal walls, with one of a pair of longitudinal flanges extending coextensively with and generally perpendicularly from each of said first and third longitudinal walls, said first and third longitudinal walls from which said flanges extend being located on opposite sides of said casing member with each of said flanges projecting from the associated wall toward the flange on the opposite one of said longitudinal walls;

said flanges defining therebetween an elongated opening spaced opposite to said second longitudinal wall;

a pair of end walls located on opposite ends of said casing member extending transversely to said elongated opening

and affixed to said casing member to close the ends thereof;

each of said end walls having edges spaced from each of said pair of flanges to define therebetween guide slots adapted to have a panel member slideably engaged therein for longitudinal sliding movement along said casing member to open and close said opening defined between said pair of flanges;

fastening means for fixedly fastening said casing member to one of said door member and said frame member;

a panel member replaceably fitted within said guide slots between said flanges and said edges of said end walls to close said opening defined between said flanges, said panel member being decoratively arrayed and adapted to be replaced by another panel member to change the decorative effect of said assembly;

an automatic door closing mechanism including a motor portion and an output member projecting from said motor portion and operating to automaticly close said door member when operatively engaged between said door member and said frame member;

mounting means for fixedly mounting said closing mechanism within said casing member, said casing member together with said end walls and said panel member forming a decorative housing for said closing mechanism; and

means defining a plurality of openings located at predetermined positions in at least one of said first and said third longitudinal walls of said casing member, each of said openings being sized to permit said output member to project therethrough for operative connection with the other of said door member and said frame member when said closing member is mounted within said decorative housing in any one of a plurality of operative positions;

said mounting means being arranged to selectively enable mounting of said closing member within said decorative housing in any one of a plurality of operative positions depending upon the operating conditions within which said assembly is to be mounted and the particular arrangement whereby said door member is hinged relative to said frame member, said means defining said plurality of openings and said mounting means being cooperatively related to permit said assembly to be adapted for operative mounting between said door member and said frame member in any one of a plurality of said operating conditions.

4,231,135

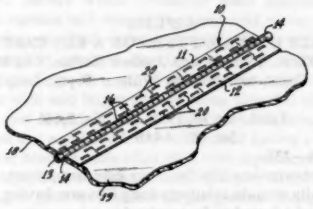
FLEXIBLE AND SEWABLE HINGE

Raymond Fradin, 2006 Navy St., Santa Monica, Calif. 90405

Filed Apr. 30, 1979, Ser. No. 34,626

Int. Cl.³ E05D *3/02, 5/02*

U.S. Cl. 16—150 **5 Claims**



1. A flexible and sewable hinge comprising: a pair of elongated generally flat flanges of a resilient, flexible and pliable material, an aligned series of evenly spaced tubular cylindrical knuckles formed integrally with one elongated edge of each said flange with the spacing of the knuckles in the second flange to be inserted into the spaces between the knuckles in the first flange whereby upon such insertion, the tubular portion of all of the knuckles in both of said flanges are in an aligned relationship, a flexible and pliable hinge pin with a tubular cross section and sized to be inserted through the tubular portion of all of said knuckles of both flanges when they are in said aligned relationship, means for retaining said pin in the aforestated position, and an elongated rod sized to be slideably inserted substantially through the entire tubular center of said hinge pin.

4,231,136

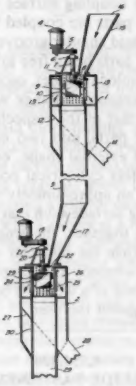
BAGASSE DEPITHING

Eduardo J. Villavicencio, Mexico City, Mexico, assignor to Process Evaluation & Development Corporation, Dallas, Tex.

Continuation of Ser. No. 811,090, Jun. 29, 1977, abandoned, which is a continuation-in-part of Ser. No. 624,686, Oct. 22, 1975, abandoned. This application Aug. 28, 1978, Ser. No. 937,575

Int. Cl.² D01B *1/30, 1/38, 1/50*

U.S. Cl. 19—7 **8 Claims**

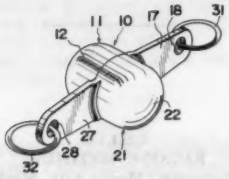


1. An improvement in the method of processing fibrous vegetable materials containing pith for the separation of the pith from the fiber which method comprises feeding said fibrous vegetable materials into the upper inlet end of a first vertical depither consisting essentially of a cylindrical screen element having disposed therein a rotating element having an array of hammers, repeatedly contacting said fibrous vegetable materials with said array of hammers thereby vertically orienting said fibers on said screen element, separating and removing pith from said fibers by forcing said pith through said screen element and moving said fibers downwardly while vertically oriented, collecting depithed fibers exiting from a lower fiber outlet end of said first vertical depither, and subsequently as a separate operation feeding said fibers which have had a portion of pith removed therefrom into a second vertical depither for further separation of pith from said fiber, the improvement comprising, arranging said first vertical depither above said second vertical depither and interconnecting the lower fiber outlet end of said first vertical depither to the upper fiber inlet end of said second vertical depither whereby the fibers in a vertical orientation exiting the outlet end of said first depither fall downwardly and enter said second vertical depither while remaining in such vertical orientation thereby enhancing pith removal in said second vertical depither.

4,231,137
CLASP FOR PERSONAL ORNAMENTS OR FURNISHINGS

Toshio Fujimoto, 7-6, Ochayasho-cho, Nishinomiya-shi, Hyogo-ken, Japan

Filed Jan. 23, 1979, Ser. No. 5,831
Claims priority, application Japan, Jun. 29, 1978, 53-90276[U]
Int. Cl.³ A44B 17/00
U.S. Cl. 24—201 B 7 Claims

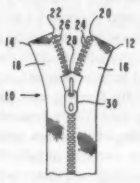


1. A clasp for personal ornaments or furnishings, the clasp comprising two metallic parts at least one of which attracts the other by virtue of magnetic property, said metallic parts can be removeably coupled together, one of the said metallic parts having an annular projection formed on the coupling surface thereof, the other of said metallic parts having an annular groove formed in the coupling surface thereof, so that when the said two metallic parts are coupled together, said annular projection is fitted in said annular groove, said one of said parts and said other of said parts being free to rotate with respect to one another when coupled together, each of said metallic parts being formed with a respective flange which extends laterally in the same plane as that of the respective said coupling surfaces of said metallic parts, said two metallic parts being of substantially identical external shape, each said metallic part having an approximately cylindrical portion adjacent its said coupling surface and an approximately semispherical end opposite its said coupling surface such that when said two metallic parts are coupled together, the length of the clasp from end-to-end is longer than the diameter of said approximately cylindrical portions, whereby the coupling direction can be extended along a surface of a wearer's body with the cylindrical portions resting against the user.

4,231,138
SLIDE FASTENER

George B. Moertel, Conneautville, Pa., assignor to Textron, Inc., Providence, R.I.

Filed Nov. 17, 1978, Ser. No. 961,449
Int. Cl.² A44B 19/02
U.S. Cl. 24—205.16 R 9 Claims

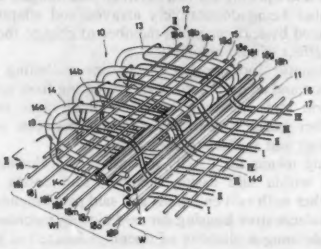


1. A slide fastener comprising
a pair of mounting tapes having adjacent side edges;
a warpless area formed in each mounting tape proximate the adjacent side edge thereof;
a plurality of coupling elements mounted on the adjacent side edges of each of the mounting tapes; and
interconnecting straps connecting each of the coupling elements with each of the adjacent coupling elements, the interconnecting straps being formed of the material from which the coupling elements are formed being filled into the warpless areas of the respective mounting tapes.

4,231,139
WOVEN STRINGER FOR SLIDE FASTENERS

Noritaka Tsubata, Uozu, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

Filed Jun. 18, 1979, Ser. No. 49,474
Claims priority, application Japan, Jul. 3, 1978, 53-80767
Int. Cl.³ A44B 19/00
U.S. Cl. 24—205.16 R 5 Claims



1. A woven fastener stringer comprising a woven tape formed with foundation warp and weft threads and consisting of a web section defining a major dimension of said tape and a woven filament section defining a longitudinal edge portion of said tape; a row of successively interconnected elongated loops woven into said filament section and interengageable with another row on a mating stringer by the action of a slider, each of said loops having a coupling head at one end thereof, an upper leg and a lower leg extending from said head in a common direction, and a heel portion remote from said head connected to a next adjacent one of said successive loops; a plurality of covering warp threads overlying and underlying said loops; a stuffing cord extending longitudinally of the tape through said row of loops; at least one guide cord having a knit structure wound around a core and extending longitudinally of the tape in abutting conforming engagement with the outer peripheral surfaces of said heel portions; and a binding weft thread continuing from said foundation and interwoven with said covering warp threads in said woven filament section, said binding weft thread being tensioned to bite into the material of said stuffing cord and deform said guide cord to produce a rigid guide surface for the slider, said stuffing cord being thermally expandable to augment the effective bite of said binding weft thread into the material of the stuffing cord.

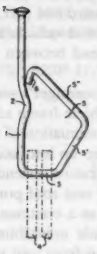
4,231,140
KEY CLIP ADAPTED FOR A KEY CASE

Mark A. Ebreo, Putnam, and Andrew Koches, Old Saybrook, both of Conn., assignors to William Prym, Inc., Dayville, Conn.

Filed Jan. 10, 1979, Ser. No. 2,461
Int. Cl.² A44B 13/02
U.S. Cl. 24—237 1 Claim

1. A bent-wire key clip for a key case comprising:
a generally straight relatively long first arm having a boss at one end adapted to be received in a key case;
a straight relatively short second arm extending at a right angle to said first arm at the opposite end thereof and coplanar therewith;
a straight third arm shorter than said first arm and longer than said second arm and including a first obtuse angle with said second arm;
a straight fourth arm shorter than said first arm and longer than said second arm and bent at a second obtuse angle to said third arm, said fourth arm approaching said first arm in the region of the center thereof, all of said arms being

coplanar, said first arm having an indent bent inward toward said third and fourth arms between said region and said opposite end; and



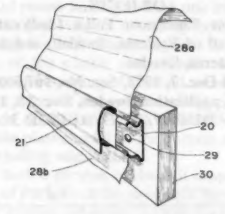
a finger bent at an acute angle from said fourth arm toward said indent and resiliently bearing upon said first arm adjacent said indent and between said indent and said boss.

4,231,141

ATTACHMENT DEVICE FOR FLEXIBLE FILMS AND FABRICS

Danny O. Derrick, 5935 McMillan Cir., Columbia, S.C. 29210, and Donald F. Looney, P.O. Box 685, Irmo, S.C. 29063

Filed Jul. 26, 1978, Ser. No. 928,180
Int. Cl.[2] A44B *21/00*
U.S. Cl. 24—243 K **5 Claims**



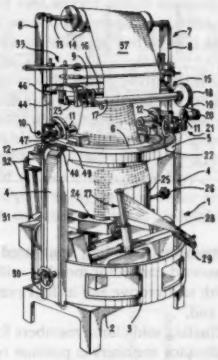
1. In a two piece separable device for securely holding flexible material having an inner and an outer surface, the combination comprising complementary inferior male means beneath said inner surface and superior female means above said outer surface which releasably mate together by flex action to capture said material between said means, said male means being provided with an arcuate concave groove opening outward in opposite directions on each of its two outwardly extending sides, one of said grooves being larger than the other with said larger groove being disposed towards the body of said material, and said female means being substantially even and regular in cross-section and having a symmetrical arcuate bead on each edge of its two dependent sides, said beads having a cross-section complementary to the smaller of said concave grooves and said larger groove having sufficient larger size relative to said engaging bead to permit said female means to be rotationally displaced by a tension load placed on said flexible material while being sufficiently small in size to prevent rotational disengagement of said bead due to said tension load, thereby clamping said material between said female and said male means without permitting rotational disengagement of said bead due to said tension load, said grooves and said beads being arranged to engage each other so as to interlock and thereby securely clamp said material between said male and said female means in response to said rotational displacement.

4,231,142

STOP MOTION FOR BAND CUTTING DEVICE

Luigi Pisani, Cilavegna, Italy, assignor to Officina Meccanica Pisani Luigi, Pavia, Italy

Filed Sep. 20, 1977, Ser. No. 835,021
Claims priority, application Italy, Oct. 29, 1976, 28835 A/76
Int. Cl.[2] B21D *43/26*; B26D *3/16*
U.S. Cl. 29—2.16 **4 Claims**



1. In a band cutting machine comprising a stationary lower frame having a central axis, a cloth-feeding mechanism for advancing tubular material to be cut into strips supported by said frame, a cutting apparatus mounted on said frame to cut out said strips from said cloth-feeding mechanism, a driving device for the cloth feeding mechanism and the cutting apparatus and an upper frame carried on said stationary lower frame, said upper frame being rotatable about the central axis of the lower frame and supporting a roll for cloth to be cut into strips and a roller stretcher which serves as a means for guiding said cloth as it is drawn from said roll and an advancer to the cutting apparatus, the improvement which comprises a stop switch positioned on said lower frame, a vertically movable actuator means above said switch and a pivotable stretch detector means carried on said upper rotatable frame, said stretch detector means governing the vertical movement of said actuator means, said detector means pivoting when the cloth is no longer in a stretched condition when passing through the roller stretcher to lower said actuator which actuates the stop switch for arresting operation of the band cutting machine.

4,231,143

ELECTRODE AND APPARATUS FOR FORMING THE SAME

Gerald R. Pohto, and Richard O. Olson, both of Mentor, Ohio, assignors to Diamond Shamrock Corporation, Dallas, Tex.

Division of Ser. No. 791,725, Apr. 28, 1977, Pat. No. 4,129,292.
This application Oct. 16, 1978, Ser. No. 951,582
Int. Cl.[3] B25B *27/14*
U.S. Cl. 29—281.5 **4 Claims**

1. Apparatus for forming an electrode subassembly of the type including a generally cylindrical riser member and a pair of longitudinally extending V-shaped connector members which have their bight portions joined to the riser member on diametrically opposite sides with the leg portions extending radially, said apparatus comprising:

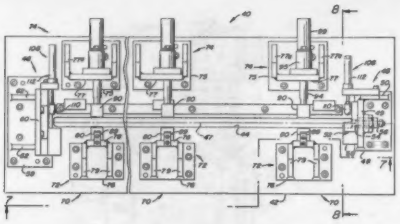
a base member having a longitudinally extending through groove;

pairs of cooperating clamp members located on said base on opposite sides of said through-groove, at least one clamp member of each pair being mounted for movement toward said groove;

first support means associated with said base for supporting a first V-shaped connector member with its bight portion

aligned with said groove and its legs extending toward said base and on opposite sides of said groove;

second support means for supporting a riser member over said groove and in axial alignment therewith, said second support means adapted to hold a cylindrical riser member over and in engagement with the bight portion of a connector member supported on said first support means;



said clamp members including contoured surfaces for supporting a second connector member with its bight portion aligned with said groove and its legs extending away from said base; and,

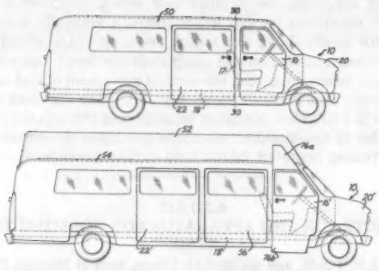
means for actuating said clamp members for positively holding the connector members in position relative to the riser member.

4,231,144

METHOD OF CONVERTING A VAN-TYPE VEHICLE TO A MULTI-PASSENGER COMMERCIAL TRANSPORTATION VEHICLE

George Bernacchia, Jr., Yonkers, N.Y., assignor to National Custom Van Corp., Yonkers, N.Y.

Filed Jan. 31, 1979, Ser. No. 7,940
Int. Cl.[2] B23P *6/00, 17/00, 19/00*
U.S. Cl. 29—401.1 11 Claims



1. A method of converting a van-type vehicle to a multi-passenger commercial transportation vehicle, said vehicle having front and rear wheels, a chassis mounted on said wheels carrying a vehicle body and having two or more longitudinally extending support members, said vehicle body having a driver door, and a passenger door adjacent the front seats of said vehicle, and an auxiliary cargo door and cargo door entrance way on one side of said vehicle behind either of said driver or said passenger door, comprising the steps of:

(a) cutting, in a plane substantially transverse of said longitudinal support members, both said chassis and said vehicle body into a forward section and a rear section, said plane lying between the forward and rear wheels of the vehicle;

(b) separating longitudinally said forward and rear sections;

(c) attaching coaxially a chassis extension support member between the forward and rear sections of each said longitudinal support member;

(d) cutting off the roof portion of said vehicle body along the periphery of the upper vehicle body;

(e) attaching an upwardly enlarged roof portion to said vehicle body along said periphery;

(f) attaching fixed side wall members, flush with the side walls of said forward and rear sections, to said cargo door entrance and to said vehicle body on either side thereof and fitted to extend between said forward and rear sections;

(g) removing said passenger's seat and attaching a step well means to said vehicle frame adjacent said passenger door and forming a continuation of the passenger door opening for permitting step up into said vehicle;

(h) forming a roof cutout extending partially upward from said periphery in said roof portion in the area above said step well means as a continuation of the passenger door opening to provide uninhibited passenger boarding and unboarding to and from said vehicle;

(i) providing door extension means on the upper and lower ends of said passenger door for closing said passenger door opening when said door is closed; and

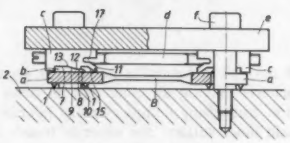
(j) attaching door opening means operable from the driver's seat for opening said passenger door.

4,231,145

METHOD AND APPARATUS FOR ATTACHING TWO OBJECTS

Orvar Dahle; Olov Einarsson; Folke Lindkvist, and Stefan Valdemarsson, all of Vesteras, Sweden, assignors to ASEA Aktiebolag, Vesteras, Sweden

Filed Dec. 7, 1978, Ser. No. 967,509
Claims priority, application Sweden, Dec. 13, 1977, 7714103
Int. Cl.[3] B23P *11/00, 19/00;* B21D *39/00*
U.S. Cl. 29—432 7 Claims



1. Method for attaching a deformation transducer to a measured object without creep, the transducer being arranged in a space between a plate clamped relative to the measured object, the deformation transducer having at least two attachments formed by a number of points or the like at each attachment and with a deformation-sensing element between the said attachments, comprising the steps of:

providing a normal force securing the transducer by a clamping force determined by mutually movable pressure surfaces included in each attachment, the points being pressed into the measured object to a depth determined by the pressure surfaces; and

at least partially disengaging the pressure surfaces to reduce the clamping force to such a value that the stresses in the material in the measured object making contact with the surfaces of the points are reduced to such an extent below the yield point that an additional force from the deformation-sensing element perpendicular to the normal force cannot again increase the stress in the material of the measured object at the surfaces of the points to above the yield point.

4,231,146

METHOD OF MAKING A TIP FOR A BALL POINT PEN

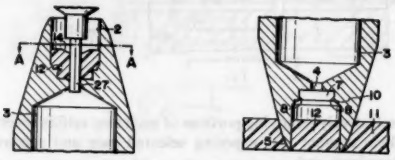
Eishiro Nakagawa, Ageo; Taketoshi Miyamoto, Tokyo; Naozi Umino, Koshigaya, and Hirosi Oyama, Soka, all of Japan, assignors to Pentel Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 776,372, Mar. 10, 1977, abandoned. This application Feb. 15, 1979, Ser. No. 12,553

Claims priority, application Japan, Mar. 19, 1976, 51-32283; Feb. 17, 1977, 52-16449

Int. Cl.³ B23P *11/00*

U.S. Cl. 29—432 **11 Claims**



1. In a method of making a tip for a ball point pen including forming a cylindrical metallic tip body having a pointed end, a ball receiving hole having the opening thereof at the pointed end of the tip body and a bore for delivering ink to the ball receiving hole and having the opening thereof at the end of the tip body opposite to the pointed end, inserting a ball supporting seat of a plastic into the bottom of the ball receiving hole, putting a ball on the ball supporting seat in the ball receiving hole, and forming the pointed end of the tip body over the ball for holding the ball in the tip body; the improvement comprising the steps of, after forming the tip body,

forming a recess in the bottom surface of the ball receiving hole, said recess having at least one angular portion,

applying the pointed end of the tip body onto a sheet of a plastic for the ball supporting seat to thereby cut out a portion of the plastic and transfer said portion of the plastic to the opening of the ball receiving hole,

forcing the thus cut out portion of the plastic deep into the bottom of the ball receiving hole and deforming the portion of the plastic to fill all the corners of the bottom of the hole including said recess,

punching both a portion of the ball supporting seat and the bottom of the hole at the same time thereby forming an ink guiding groove between the ball receiving hole and the ink delivering bore through the ball supporting seat, and then putting the ball on the ball supporting seat.

4,231,147

METHODS AND APPARATUS FOR INSTALLING CLUTCHES IN AUTOMATIC TRANSMISSIONS

David Witt, 1731 Marian Dr., Norman, Okla. 73069

Filed Nov. 30, 1978, Ser. No. 964,878

Int. Cl.³ B23P *19/04*

U.S. Cl. 29—433 **5 Claims**

1. A method of installing second and third clutch assemblies in an automatic transmission, said method comprising the steps of:

placing a first cylindrical alignment tool, having a plurality of external splines, within a clutch housing of a first clutch assembly;

placing a plurality of annular clutch plates about said first alignment tool, said plates having radially inner teeth engaging said splines of said first alignment tool;

applying fluid under pressure to a piston of said first clutch assembly to apply an axial compressive force to said plates;

removing said first alignment tool, while said axial compressive force is being applied;

engaging an externally axial splined portion of said second clutch assembly with said plates while said axial compressive force is being applied, said splines of said second clutch assembly engaging said inner teeth of said clutch plates of said first clutch assembly;

placing a second cylindrical alignment tool, having a plurality of external splines, within a plurality of annular clutch plates of said second clutch assembly, said plates having radially inner teeth engaging said splines of said second alignment tool;

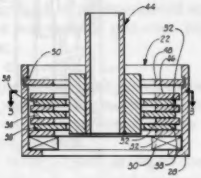
applying fluid under pressure to a piston of said second clutch assembly to apply an axial compressive force to said plates of said second clutch assembly;

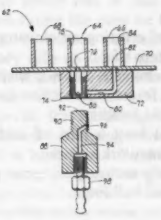
removing said second alignment tool, while said axial compressive force is being applied to said second clutch assembly plates; and

engaging an externally splined portion of said third clutch assembly with said plates of said second clutch assembly, while said axial compressive force is being applied to said second clutch assembly plates, said splines of said third clutch assembly engaging said inner teeth of said clutch plates of said second clutch assembly;

wherein said steps of applying fluid under pressure to pistons of said first and second clutch assemblies comprise the steps of:

inserting a valve, having first and second outlet nozzles,





into a valve body of said transmission, said first and second nozzles communicating with a center support orifice and a direct clutch apply orifice, respectively;

moving said valve to a first position directing fluid under pressure to said first outlet nozzle; and

moving said valve to a second position directing fluid under pressure to said second outlet nozzle.

3. Apparatus for installing a second clutch assembly in an automatic transmission comprising:

a first cylindrical alignment tool, having a plurality of axial splines for engagement with teeth of a stack of clutch plates of a first clutch assembly of said automatic transmission;

a second cylindrical alignment tool, having a plurality of axial splines for engagment with teeth of a stack of clutch plates of said second clutch assembly; and

valve means, variable between a first position for directing fluid under pressure to a piston of said first clutch assembly to apply an axial compressive force to said stack of clutch plates thereof to retain said teeth of said clutch plates of said first clutch assembly in axial alignment when said first alignment tool is removed so that an axially splined cylindrical portion of said second clutch assembly may be inserted in the position previously occupied by

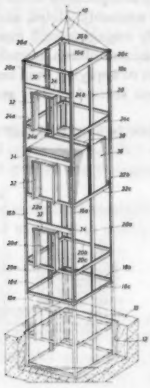
said first alignment tool, and a second position for directing fluid under pressure to a piston of said second clutch assembly to retain teeth of said stack of clutch plates of said second clutch assembly in axial alignment after said second alignment tool is removed so that an axially splined cylindrical body may be inserted in the position previously occupied by said second alignment tool.

4,231,148

ELEVATOR ERECTION METHOD

Allen W. Harding, Seabrook, Tex., assignor to ABC Elevators, Inc., Seabrook, Tex.

Filed Mar. 9, 1978, Ser. No. 884,982
Int. Cl.³ E04B *1/00*
U.S. Cl. 29—469 **17 Claims**



1. A method of erecting an elevator system for a building comprising the steps of:

fabricating an elongate elevator shaft framework section;

mounting said framework section in an upright position at the site of said building

constructing at least a part of said building around said mounted framework section;

and subsequently securing an upper part of said framework section to said building.

4,231,149

NARROW BAND-GAP SEMICONDUCTOR CCD IMAGING DEVICE AND METHOD OF FABRICATION

Richard A. Chapman, Dallas; Dennis D. Buss, Richardson, and Michael A. Kinch, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 10, 1978, Ser. No. 950,191
Int. Cl.³ B01J *17/00*
U.S. Cl. 29—578 **6 Claims**

1. A process for fabricating an infrared CCD imager comprising the steps of:

(a) oxidizing the surface of a monocrystalline HgCdTe body to form an oxide layer 500–1000 angstroms thick;

(b) selectively removing predetermined portions of said oxide layer to form apertures therein;

(c) forming suitable doped regions in said apertures to form junction diodes with the HgCdTe surface;

(d) depositing a layer of zinc sulfide to cover the oxide-conductor composite layer;

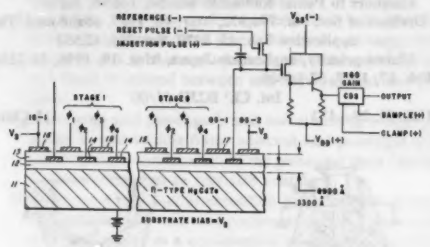
(e) depositing and patterning a channel-stop conductor on said zinc sulfide to define the CCD channel;

(f) depositing and patterning a second zinc sulfide layer to overlap said channel-stop conductor;

(g) depositing and patterning a first plurality of metal gates on said second zinc sulfide layer;

(h) depositing a third layer of zinc sulfide to cover said gate;

(i) depositing and patterning a second plurality of metal gates on said third zinc sulfide layer;



(j) selectively removing portions of each zinc sulfide layer to form contact vias exposing selected gate and substrate locations; and

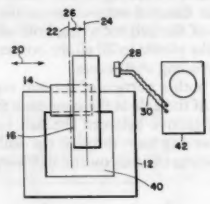
(k) then forming conductive contacts to said exposed locations.

4,231,150

METHOD OF TUNING A FLYBACK TRANSFORMER FOR MINIMUM RINGING

Forrest E. Brooks, Raleigh, N.C., assignor to Telex Computer Products, Inc., Raleigh, N.C.

Filed Dec. 4, 1978, Ser. No. 966,511
Int. Cl.³ H01F *41/02*
U.S. Cl. 29—593 **2 Claims**



1. The method of optimizing a flyback transformer in a cathode ray tube control system for minimum ringing, comprising the steps of;

(a) placing in said system a standard flyback transformer having a core, a primary or low voltage coil, and a secondary or high voltage coil;

(b) placing a suitable sensor in the vicinity of said high voltage coil to pick up a signal, which is a function of the voltage waveshape in said high voltage coil, and displaying said pickup signal on a cathode ray oscilloscope;

(c) positioning said primary at a selected position, and relatively displacing and adjusting the central plane of said high voltage coil laterally with respect to the central plane of said primary coil, while noting the amplitude of ringing in said pickup signal, until a selected relative position is reached, where said ringing is a minimum; and

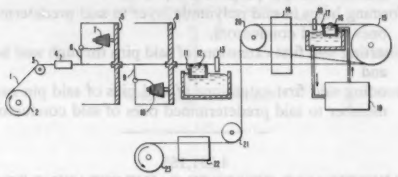
(d) locking said high voltage and low voltage coils against relative lateral movement at said selected position with respect to each other and to said core.

whereby said flyback transformer will be tuned for minimum ringing.

4,231,151
METHOD AND APPARATUS FOR MANUFACTURING A FILAMENT SERVED BONDABLE CONDUCTOR

Norman G. Haderer, and J. Harold Troy, both of Bristol, Va., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 3, 1978, Ser. No. 948,138
Int. Cl.³ H01F *41/06*
U.S. Cl. 29—605 11 Claims

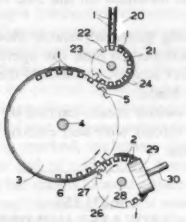


1. A method of making a fused coil comprising:
(1) wrapping a metal wire with an insulating yarn;
(2) suspending said wire between a first support and a second support, there being no support in between said first support and said second support;
(3) immersing said wire in a heat curable varnish after said wire passes over said first support;
(4) wiping excess varnish off said wire;
(5) heating said wire in an oven to cure said varnish before said wire passes over said second support;
(6) suspending said wire between a third support and a fourth support, there being no support in between said third and fourth supports;
(7) immersing said wire in a heat curable enamel after said wire passes over said third support;
(8) wiping excess enamel off said wire;
(9) heating said wire in said oven sufficiently to cure said enamel to a nontacky B-stage before said wire passes over said fourth support;
(10) winding said wire to form said coil; and
(11) heating said coil to cure and fuse said enamel.

4,231,152
METHOD AND APPARATUS FOR PRESS-FITTING CAPS ON ELECTRONIC PARTS AND THE LIKE

Shigeru Kubota, Tokyo; Seiji Kano, Yokohama, and Masahiro Kubo, Machidashi, all of Japan, assignors to Nitto Kogyo K.K., Tokyo, Japan

Filed Jan. 4, 1979, Ser. No. 881
Claims priority, application Japan, Jan. 19, 1978, 53/4456
Int. Cl.³ H01C *17/28*
U.S. Cl. 29—621 6 Claims



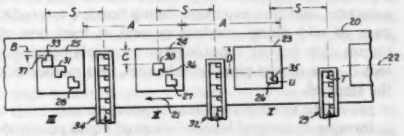
1. A method of press-fitting caps on electronic parts and the like, comprising the steps of:
feeding component rods of electronic parts laterally from a supply into transverse notches of a rod guiding wheel, and from the rod guiding wheel into transverse notches of a rod conveying wheel;
rotating a pair of cap conveying wheels in synchronization with the rod conveying wheel and disposing the cap conveying wheel symmetrically and obliquely with respect to the rod conveying wheel on opposite sides thereof and in contacting relationships therewith on the opposite sides of the bottom part of the rod conveying wheel;
feeding caps from a supply into a plurality of transverse notches in the inner peripheral part of each cap conveying wheel;
pressing the caps onto the ends of the rods as the rod and cap conveying wheels are rotated;
feeding the assembled rods and caps one-by-one and sequentially from the notches of the cap conveying wheel into corresponding transverse notches of a take-up wheel rotated in synchronized, opposed relation to the rod conveying wheel; and
pressing the caps firmly onto the rods with a pair of press rollers rotated in pressing contact with the caps at opposite sides of the take-up wheel.

5. An apparatus for press-fitting caps on electronic parts and the like, comprising;
a rod feeding device for feeding component rods of electronic parts;
a rod conveying wheel provided on its circumference with lateral grooves disposed at predetermined intervals and adapted to receive and convey said rods fed from said rod-feeding device;
a device for feeding caps;
a pair of cap conveying wheels each provided on one side of its circumference with lateral grooves disposed at predetermined intervals so as to receive and convey the caps fed from said cap-feeding device;
said cap conveying wheels being arranged symmetrically and obliquely with respect to said rod conveying wheel on opposite sides thereof so that the lower ends thereof come in contact with the lower end of said rod conveying wheel, thereby press-fitting the caps on both ends of the respective rods to form rod and cap assemblies;
a rod and cap assembly take-up wheel positioned adjacent the lower end of the rod conveying wheel and provided on its circumference with lateral grooves disposed at predetermined intervals for receiving the rod and cap assemblies from said rod conveying wheel one-by-one;
press rollers provided at both sides of and in the vicinity of said wheel for completely press-fitting the caps on the rods by externally pressing both ends of the respective rod and cap assemblies while being conveyed by said take-up wheel;
and a drive means for rotating all of said wheel in synchronization with one another and at the same circumferential speed.

4,231,153
ARTICLE PLACEMENT SYSTEM

Lawrence T. Browne, 690 El Rancho Rd., Santa Barbara, Calif. 93108

Filed Feb. 22, 1979, Ser. No. 13,818
Int. Cl.³ B23P *19/00, 21/00*
U.S. Cl. 29—739 13 Claims



1. An article placement system for applying a plurality of articles to a substrate, each article being placed at a different location on said substrate, said system comprising:
a base;

a walking beam mounted to the base, said walking beam having an axis of bi-directional movement, and a dimension of length along said axis;

a plurality of article transfer members mounted to said walking beam at axially spaced-apart locations from one another;

conveyor means extending axially beneath said article transfer members for conveying substrates to positions beneath successive ones of said article transfer means;

a plurality of article supply members, each having a respective delivery point where it provides an article to a respective one of said article transfer members;

drive means axially bi-directionally moving said walking beam, and thereby all of the article transfer members simultaneously by a unit distance, between a respective delivery point and a respective deposit point and reversely;

stepper means intermittently moving said conveyor means by an indexing distance, whereby to move all substrates simultaneously beneath successive deposit points;

supply positioning means mounting each said article supply member to the base whereby its respective delivery point is axially and laterally adjustable;

transfer positioning means mounting each said article transfer member to said walking beam for axial and lateral adjustment to meet the respective delivery point;

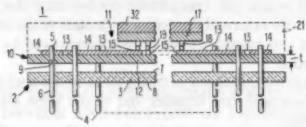
whereby said stepper means intermittently operates to cause the conveyor means to move the substrates beneath successive deposit points, and the walking beam oscillates to move the article transfer means from the delivery point of their respective article supply member where they pick up an article, to their respective deposit point where they deposit it.

4,231,154

ELECTRONIC PACKAGE ASSEMBLY METHOD

Charles E. Gazdik, Endicott, and Donald G. McBride, Binghamton, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 10, 1979, Ser. No. 2,473
Int. Cl.³ H05K *3/06, 3/10, 3/34*
U.S. Cl. 29—840 **10 Claims**



1. The method for making at least one electronic package assembly, said assembly having at least an insulator pin carrier member, plural conductive elongated pluggable pins carried by said member, each of said pins being extended through said member to provide first and second extensions past first and second surfaces, respectively, of said member, a thin flexible printed circuit conductive member having a polyimide substrate of a predetermined thickness of substantially 5 microns, a printed circuit pattern of plural conductors supported by said substrate, said first extensions being bonded to predetermined ones of said plural conductors, and at least one electronic circuit chip having input/output terminals bonded to preselected ones of said plural conductors, said method comprising the steps of:

providing temporary planar support means,

forming an integral layer of uncured liquid polyimide on one surface of said support means sufficient to provide said predetermined thickness when said polyimide is subsequently cured,

curing said polyimide layer,

circuitizing the outer surface of said cured polyimide layer with said plural conductors of said predetermined circuit pattern,

providing said insulator pin carrier member and said plural pins carried thereby,

providing said electronic circuit chip,

bonding said terminals of said chip to said preselected ones of said conductors,

selectably removing portions of said temporary support means from said polyimide layer,

forming holes in said polyimide layer to said predetermined ones of said conductors,

inserting said first extensions of said pins through said holes, and

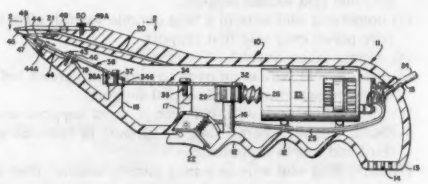
bonding said first extensions of said pins of said pin carrier member to said predetermined ones of said conductors.

4,231,155

ELECTRICALLY POWERED PAINT SCRAPING TOOL

Bruce Johne, 211 Ramsay Alley, Alexandria, Va. 22314

Filed May 10, 1979, Ser. No. 37,664
Int. Cl.³ A47L *11/12*
U.S. Cl. 30—169 **7 Claims**



1. An electric paint scraping tool comprising:

(a) a support casement,

(b) an electric motor mounted in said casement having a rotary drive shaft extending therefrom,

(c) a worm gear secured to said drive shaft,

(d) a pair of worm pinions in mesh with said worm gear,

(e) a pair of primary arms pivotally mounted to said casement and connected to be driven by said worm pinions at one side of said pivot and having a slotted end at the other side of said pivot,

(f) a blade holder member,

(g) a pair of L-shaped bell crank secondary arms pivotally mounted to said blade holder member proximate the juncture of the leg and foot of said L-shaped bell crank and connected to reciprocatingly drive said blade holder member,

(h) said secondary bell crank arms being connected to be driven by said primary arms,

(i) a razor blade mounted on the free end of blade holder member,

(j) a blade limiting guard adjustably mounted on said casement and positioned to limit the operating surface of the blade to protect support surfaces of the area to be cleaned by said razor blade,

(k) and trigger switch means carried by said casement and connected in circuit with said electric motor to start and stop said motor.

4,231,156

GUIDE LINE HOLDER

Izates C. Cooper, El Cajon, Calif., assignor to Lawrence F. Myers, El Cajon, Calif.

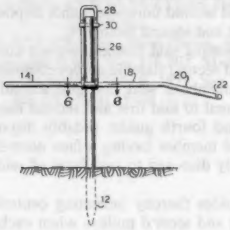
Filed May 24, 1979, Ser. No. 41,906
Int. Cl.³ G01C *15/00*
U.S. Cl. 33—1 LE **6 Claims**

1. A guide line support tool for lines used to guide paving operations and the like, said line support tool comprising:

(a) a ground stake

(b) a line holder comprising an elongated bar having means for direct attachment of a line thereto;

(c) clamp means for mounting said line holder on said stake so as to be adjustable in three modes, longitudinally of the



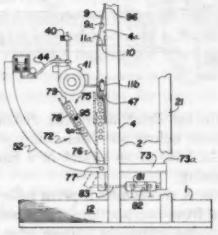
stake, transversely of of the stake by movement of the holder longitudinally of itself, and rotationally of the stake, said clamp means frictionally binding said bar against a side of said stake when adjusted in all said three modes.

4,231,157

DRAPERY CLAMPING DEVICE

Michael E. Tuskos, 5719 W. Highway 22, Crestwood, Ky. 40014

Filed Jul. 5, 1979, Ser. No. 55,030
Int. Cl.³ B43L *13/00*
U.S. Cl. 33—18 R **12 Claims**



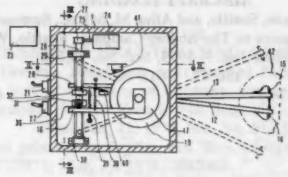
1. A drapery manufacturing device including: an upstanding frame having first and second generally parallel spaced, vertical plane defining guide tracks; horizontally disposed trolly means adapted for vertical movement on said guide means including a transverse member adapted to carry fastener means to secure one end of a length of fabric; drive means to move said trolley means vertically with respect to said frame; reference means defining a horizontal reference plane adjacent the lower end of said frame; carriage means mounted adjacent the lower end of said frame and mounted for horizontal movement in relation to said frame adjacent said reference means; marker means adapted to be carried by said carriage means; an improvement comprising: elongate clamping means located adjacent the lower end of said frame to secure the lower end of said fabric as it is being marked, including clamping base means adjacent the lower end of said frame, horizontally extending elongate clamping bar means located adjacent the lower end of said frame, elongate clamping bracket means pivotably connected to said clamping base means at two pivot points to pivot between a first position adjacent said frame to retain said fabric between said clamping bar means and said elongate clamping bracket means and a second position where said elongate clamping bracket means are disengaged from said clamping bar means to release said fabric; and actuator means to selectively operate said clamping bracket means between said first and second positions.

4,231,158

ELECTRONIC APPARATUS FOR CHECKING THE LINEAR DIMENSIONS OF MECHANICAL WORKPIECES

Mario Possati, Bologna, Italy, assignor to Finike Italiana Marposs S.p.A., S. Marino, Italy

Filed Dec. 1, 1978, Ser. No. 965,528
Claims priority, application Italy, Dec. 7, 1977, 3637 A/77
Int. Cl.³ G01B *5/08, 7/12*
U.S. Cl. 33—149 J **12 Claims**



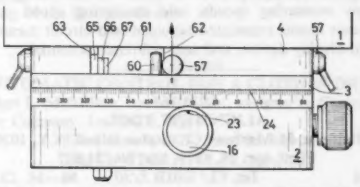
1. An electronic apparatus for checking the linear dimensions of mechanical workpieces in a wide range of operation including: a frame; two parallel shafts supported by the frame; two arms fixed to the shafts and rotating with them; transducer means to supply a signal responsive to the reciprocal movements of the two arms; a processing, indication and control unit; and control means to command the movements of the two arms comprising two measuring heads adapted to co-operate with the workpiece, arranged at the ends of said arms, said transducer means including a rotary transducer with two elements fixed to said shafts, said processing, indication and control unit being connected to the measuring heads and to the rotary transducer in order to provide signals responsive to the dimensions to be checked and to said control means, in order to activate the same control means.

4,231,159

INDEXING DEVICES

Heinz Ditzel, and Werner Ditzel, both of Hainstrasse 27-29, 6369 Schoneck 1, Fed. Rep. of Germany

Division of Ser. No. 628,649, Nov. 4, 1975, Pat. No. 4,108,024.
This application Mar. 20, 1978, Ser. No. 888,562
Claims priority, application Fed. Rep. of Germany, Nov. 5, 1974, 2452340; May 6, 1975, 2520022
Int. Cl.³ B25H *1/10*
U.S. Cl. 33—174 TD **5 Claims**



1. An indexing device comprising: first, second and third discs substantially co-axial with one another; first and second engagement means of said first and second discs, respectively interengageable to releasably latch said first and second discs in any selected one of a number of relative angular positions thereof; gage means, respective abutment surfaces of the second and third disc, whereby said second and third discs can be angularly positioned relative to each other, said gage means being disposed between said abutment surfaces of said second and third discs, and being adapted to abut both of said abutment surfaces; clamping means including a clamping member movable in an axial direction of the discs to clamp said second

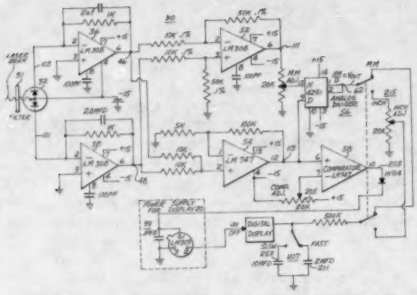
and third discs against turning relative to each other; and a disc means for use with said device disposed above said indexing device, accommodating a tool, said disc means being provided with depending skirt means surrounding said device and a lower plate positioned below said indexing device to permit access to said indexing device.

4,231,160

APPARATUS AND METHOD FOR MEASURING STATIC DEFLECTION OF RUNWAY SURFACE UNDER AIRCRAFT LOADING

Roger F. Johnson, Seattle, and Allen M. Mitzel, Sumner, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Jun. 7, 1979, Ser. No. 46,518
Int. Cl.³ G01B *11/30*
U.S. Cl. 33—174 P **4 Claims**



1. In an aircraft runway surface deflection measuring system including a reference potential, a detector circuit and a display device, said detector circuit coupled to said display device, said detector circuit comprising:

photodiode target means responsive to a reference beam of light for providing first and second output currents;

sum and difference amplifier circuits responsive to said first and second output currents for providing sum and difference signals;

analog divider circuit means responsive to said sum and difference signals for providing an output voltage;

circuit means for calibrating said display device;

said circuit means coupled between said analog divider circuit means and said display device; and,

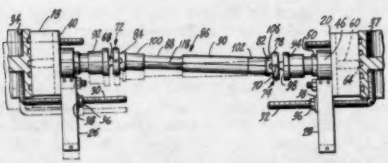
measuring speed control circuit means for providing fast or slow measuring speeds, said measuring speed control circuit means connected between said circuit means and said display device, and said reference potential.

4,231,161

ALIGNMENT TOOL

Flavio Belfiore, 36 Maybury Ct., Staten Island, N.Y. 10306

Filed Apr. 18, 1979, Ser. No. 31,327
Int. Cl.³ G01B *3/30*
U.S. Cl. 33—181 R **5 Claims**



1. An alignment tool for aligning a pair of pulleys comprising:

(a) first and second clamping means attached to the face of the first and second pulleys;

(b) first and second members mounted to said first and second clamping means, said first and second members constructed and arranged to extend normally to the face of said first and second pulleys;

(c) first and second universal joints disposed on the ends of said first and second members;

(d) a link joining said first and second universal joints;

(e) first and second slidable guides disposed on said first and second members, said first and second guides having a face normal to said first and second members;

(f) third and fourth guides slidably disposed on said link, each said member having a face normal to said link and oppositely disposed to said faces of said first and second guides;

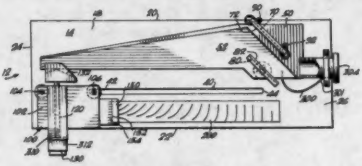
(g) said guides thereby indicating centerline alignment of said first and second pulleys when each said face of said guide is parallel to the other of said faces of said guides.

4,231,162

RANGE FINDER

Peter A. Button, P.O. Box 560578, 13010 SW. 85 Ave. Rd., Miami, Fla. 33156

Filed Feb. 26, 1979, Ser. No. 15,169
Int. Cl.³ G01C *3/00*
U.S. Cl. 33—284 **13 Claims**



1. An apparatus for determining the distance on the earth between (a) a point below an observation point at a known height and (b) the base of an object of a known height, the apparatus comprising;

a base having an A and B mirror pivot hole, said pivot holes being spaced from one another, a first and a second lever arms each having a straight bottom edge,

the first lever arm being pivotally mounted to the base for swinging movement about the A mirror pivot hole, and

the second lever arm being pivotally mounted to the base for swinging movement about the B mirror pivot hole,

an A and a B planar mirror each having a reflective surface,

the second lever arm including the B mirror and the first lever arm including the A mirror, the reflective surfaces of each of said mirrors facing one another and being substantially parallel,

an object height adjustment assembly comprising, a carriage,

the base including guide means defining an elongate track being a longitudinal center line and, means connected for movement along the track of the base,

the carriage including a member having a first end perpendicular to the center line of the elongate track, means on the carriage captivating the member for movement perpendicular to the center line of the track, the first end of the member bearing against each of the lever arms for tilting the levers upon movement of the member, and biasing means on the base normally urging the lever arms into engagement with the member,

the member having a second end comprising an operator means for moving the member, and including reference markings,

an elongate previously calculated distance scale on the base adjacent the elongate track, and the carriage including reader indicia having a first reference line perpendicular to the elongate track, and the reader indicia further in-

cluding a cross-referenced line perpendicular to the reference line and intersecting with the reference line.

4,231,163

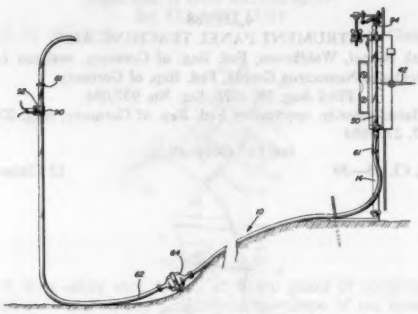
LEVEL INDICATING AND ELEVATION INDICATING DEVICE

Harry E. Turloff, 3378 Clyde Dr., Port Huron, Mich. 48060

Continuation-in-part of Ser. No. 776,907, Mar. 11, 1977, abandoned. This application Feb. 9, 1979, Ser. No. 10,969

Int. Cl.³ G01C *5/04, 9/22*

U.S. Cl. 33—367 **11 Claims**



5. An elevation indicating device including elongated liquid conduit means having transparent opposite end portions and including at least a midportion disposed between said opposite end portions which is flexible, one of said end portions having a float loosely received therein for free vertical shifting in response to increases and decreases in the level of liquid in said one end portion, support means for support from a suitable supportive structure, means stationarily supporting said one end portion from said support means, switch means stationarily supported on said one end portion relative to said float, and with which said float is operatively associated for opening and closing said switch means in response to vertical oscillation of said liquid in said one end portion, indicating means including electrical signal generator means supported on the other of said end portions, only, and with which said switch means is electrically connected for sole controlling actuation and deactuation of said signal generator means, through said switch means, responsive to vertical oscillation of said float in said one end portion.

4,231,164

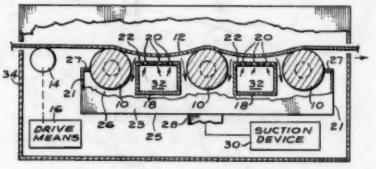
APPARATUS AND METHOD FOR UNIFORMLY HEATING OR COOLING A MOVING WEB

Eugene H. Barbee, East Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 31, 1978, Ser. No. 938,612

Int. Cl.³ F26B *3/04*

U.S. Cl. 34—16 **15 Claims**



1. A method for changing the temperature of a web, the method comprising the steps of:

(a) conveying the web with one side of the web in contact with at least two spaced parallel rollers;

(b) establishing a fluid pressure differential at opposite sides of the web which tends to deflect a web section extending between the rollers in a direction to produce a predetermined angle of contact of the web with the rollers; and

(c) producing a flow of fluid having a temperature different from that of the web in a direction substantially longitudinally of the web along and in engagement with the entire width of the one side of the web section.

4,231,165

PROCESS FOR HEAT-TREATING A FABRIC WEB

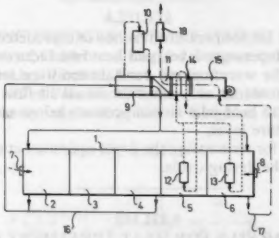
Harry Gresens, Benningen, and Manfred Schuierer, Michelstadt, both of Fed. Rep. of Germany, assignors to Bruckner Apparatebau GmbH, Erbach, Fed. Rep. of Germany

Filed Jun. 12, 1978, Ser. No. 914,532

Claims priority, application Fed. Rep. of Germany, Jun. 22, 1977, 2727971; Mar. 23, 1978, 2812966

Int. Cl.³ F26B *3/04*

U.S. Cl. 34—28 **7 Claims**



1. In a process for heat treating a fabric web to be dried and fixed wherein the web is moved through a treatment unit to pass successively through a drying zone and then through a fixing zone, said web being exposed to a hot gas stream circulated through said unit; the improvement comprising the steps of removing gas from each of said drying and fixing zones in separate respective first and second component waste gas streams, condensing condensible constituents in the first gas stream, burning combustible constituents in the second gas stream,, reheating the first gas stream following the condensing step by transfer of heat from the second gas stream, and discharging the second stream to atmosphere following the reheating of the first gas stream.

4,231,166

AUTOMATIC CONTROL FOR A CLOTHES DRYER

Stephen L. McMillan, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Oct. 9, 1979, Ser. No. 82,838

Int. Cl.³ F26B *11/04, 21/10, 21/12*

U.S. Cl. 34—48 **5 Claims**

1. An automatic control system for a clothes dryer of the type having a clothes drum, an air flow system for passing drying air through the drum and a heater for heating the air at the inlet side of the drum to enhance the drying effect of the air during the drying cycle, the drying cycle having an initial warm-up period, followed by a period of a relatively constant moisture removal rate followed by a period of a decreasing moisture removal rate, the control system comprising:

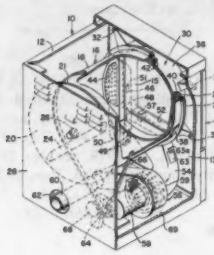
means for sensing the drum inlet air temperature;

means for sensing the drum outlet air temperature;

air flow control means for holding the volumetric flow rate of air through the drum normally at a first predetermined rate for the duration of the drying cycle and being responsive to the inlet air temperature sensing means to increase the volumetric air flow rate through the drum, only dur-

ing the warm-up and constant moisture rate periods, when the inlet air temperature exceeds a predetermined elevated temperature level corresponding to a maximum safe operating condition for fabrics in the drum;

means responsive to the inlet and outlet temperature sensing means and to the air flow control means for controlling the heater to normally supply a predetermined high rate of heat to the dryer air and for reducing the heat rate when



the inlet air temperature reaches said predetermined elevated temperature level, said heat rate reduction adapted during the warm-up and constant moisture removal rate periods to occur only when increased air flow rate exists but fails to hold inlet air temperature below said elevated temperature level;

and means for terminating the dryer operation at the conclusion of the drying cycle.

4,231,167

APPARATUS FOR HEAT TREATMENT OF CONTINUOUS TEXTILE PRODUCTS

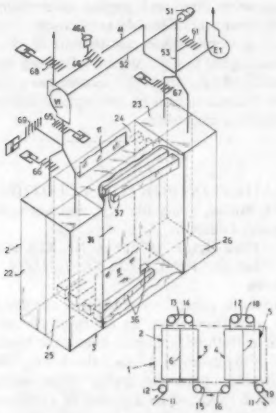
Jean Duris, Habsheim, France, assignor to Societe Alsacienne de Constructions Mecaniques de Mulhouse, Mulhouse, France

Filed Apr. 6, 1979, Ser. No. 27,887

Claims priority, application France, Apr. 7, 1978, 78 10367

Int. Cl.³ F26B *19/00*

U.S. Cl. 34—66 **6 Claims**



1. Apparatus for heat treatment of continuous textile products, such as yarn, ribbon or strip material, comprising an arrangement of vertical furnaces through which the product successively passes, each furnace having two vertically extending horizontally spaced ducts defining a space therebetween, air blowing nozzles and suction nozzles alternately supported, in pairs, within said space by respective ducts and being connected to said ducts, the upper part of the ducts of a furnace being respectively connected to a blowing fan and to an exhaust fan, the last furnace having means adapted to constitute a height adjustable partition which divides each of the two ducts of this last furnace into an upper part for hot air treatment and a lower part for cold air treatment, said lower part being also equipped with a blowing fan and an exhaust fan, wherein said means is constituted by a series of horizontal first baffles distributed throughout the height of the corresponding duct and selectively operable such that one of said baffles in a closed position forms said movable partition, the other baffles being in an open position.

4,231,168

INSTRUMENT PANEL TEACHING AID

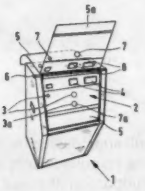
Frank Nippel, Waldbronn, Fed. Rep. of Germany, assignor to Deutsche Nemectron GmbH, Fed. Rep. of Germany

Filed Aug. 28, 1978, Ser. No. 937,096

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1977, 2738694

Int. Cl.³ G09B *19/00*

U.S. Cl. 35—39 **12 Claims**



1. A teaching aid for instructing use or operation of equipment having an instrument panel provided with at least one of operating elements and diagnostic instruments, the teaching aid comprising:

chart means for providing information regarding predetermined instructional levels, said chart means being adapted to be mounted in an overlying relationship on the instrument panel, and

wherein a plurality of such chart means are provided so as to provide a plurality of individual instructional levels as the respective chart means are removed in a predetermined sequence; and

means on said chart means for exposing only the operating elements or diagnostic instruments corresponding to a particular instructional level of said chart means.

4,231,169

INSOLE AND METHOD OF PRODUCING THE SAME

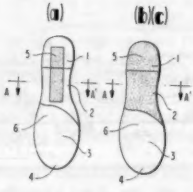
Takashi Toyama, Koganei, and Yasuo Kogo, Shizuoka, both of Japan, assignors to Toho Beslon Co., Ltd., Tokyo, Japan

Filed Jun. 21, 1978, Ser. No. 917,769

Claims priority, application Japan, Jun. 21, 1977, 52-80582[U]; Jan. 7, 1978, 53-655

Int. Cl.² A43B *13/41*

U.S. Cl. 36—43 **21 Claims**



1. An insole having a shank comprising a sheet of a synthetic

resin reinforced with fibers wherein said fibers have a specific modulus of elasticity of at least about 6×10^9 mm and a specific strength of at least about 5×10^7 mm and comprise carbon fibers or a combination of carbon fibers with glass fibers or aromatic polyamide fibers, wherein said combination comprises at least 10% by volume of carbon fibers, and wherein the volume ratio of said fibers in said synthetic resin is about 30 to about 85% by volume, said shank being put on the insole.

4,231,170

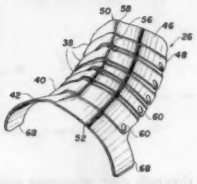
INSTEP PROTECTOR FOR SAFETY SHOES

Frank B. Griswold, R.F.D. 4, Bethlehem, Pa. 18015

Filed Feb. 2, 1979, Ser. No. 8,975

Int. Cl.[2] A43C *13/14*

U.S. Cl. 36—72 R **10 Claims**



1. In a safety shoe having an instep guard of compound curvature conforming generally to the shape of the human instep and secured to the shoe adjacent at least the lower end of the guard, the guard extending upwardly from the region of the toes of a person wearing the shoe and including a plurality of elongated, generally arch-shaped rigid strips extending transversely of the guard and of the instep of a person wearing the shoe, rivet means articulately interconnecting the plurality of rigid strips in generally side by side relation with their adjacent longitudinal side edges overlapping one another, the improvement comprising, an upwardly extending, generally arcuate arch formed in each said rigid strip and extending transversely thereof, the arcuate arches of adjacent rigid strips overlapping and cooperating to form a continuous upwardly projecting reinforcing ridge throughout substantially the full length of said instep guard.

4,231,171

METHOD AND APPARATUS FOR MINING NODULES FROM BENEATH THE SEA

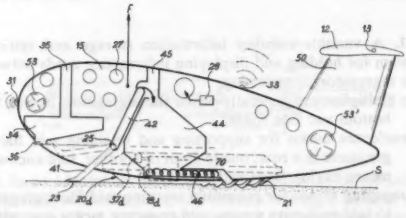
Pierre Balligand, Sceaux; Yves Corfa, Nantes; Pierre Lemercier, Grenoble; Paul Marchal, Gif-sur-Yvette, and Jean Vertut, Issy les Moulineaux, all of France, assignors to Commissariat a l'Energie Atomique, France

Filed Jan. 13, 1978, Ser. No. 869,148

Claims priority, application France, Jan. 18, 1977, 77 01288

Int. Cl.[3] E02F *3/88*

U.S. Cl. 37—54 **10 Claims**



1. A method of exploitation of a deposit of polymetallic nodules on a sea floor from a platform located at the surface of the sea, said polymetallic nodules comprising metallic material and sterile material, said nodules being adapted to be treated for separating the sterile material from the metallic material, said method including the steps of,

(a) charging with energy a plurality of self-propelled vehicles, said vehicles being provided with means for dredging and stocking said nodules, and loading said vehicles with releasable ballast,

(b) downwardly displacing said vehicles into the sea from the platform under the action of excess ballast,

(c) releasing a portion of said excess ballast at the vehicles' approach to the sea floor to make softer the landing of the vehicle on the sea floor,

(d) propelling said vehicles on the sea floor by self-propelling means carried by the vehicles, the self-propelling means consisting of at least two supporting units of revolutions, each said unit being provided with at least one helical propulsion fin, in order to dredge and stock said nodules, and simultaneously and progressively releasing said ballast so that said released ballast permanently compensates for the added weight of the stocked nodules,

(e) upwardly displacing said vehicles back to the platform by releasing the remaining portion of ballast,

(f) discharging the stocked nodules on said platform.

4,231,172

FLOATING DREDGER AND TREATMENT PLANT

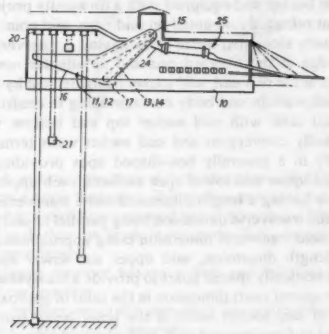
James A. Hewitt, Chislehurst, England, assignor to F. W. Payne & Son (Bickley) Limited, Kent, England

Filed Feb. 26, 1979, Ser. No. 15,136

Claims priority, application United Kingdom, Mar. 7, 1978, 8947/78

Int. Cl.[3] E02F *1/00*

U.S. Cl. 37—71 **5 Claims**



1. A dredging and treatment apparatus comprising in combination,

(a) a buoyant elongated body having longitudinal extending sides,

(b) a container mounted on said buoyant body towards one end thereof,

(c) a plurality of rails extending transversely of the longitudinal axis of the body between positions laterally of the longitudinal side of the buoyant body and positions above the container,

(d) a plurality of grab units capable of moving along said rails between said positions laterally of said longitudinal side, where the grabs of said units can be lowered for charging with material and raised with the charge, and said positions over said container where the grabs can be discharged,

(e) support means on said buoyant body,

(f) an inclined bucket elevator pivoted to said support means at its upper end on an axis about which the buckets pass at the upper end of said elevator, the lower end of said bucket elevator being movable towards and away from the bottom of the container according to the level of the material therein, and

(g) a treatment plant mounted on said buoyant body towards the other end thereof for receiving the material delivered from the upper end of the bucket elevator, and

(h) outlet means from said treatment plant.

4,231,173

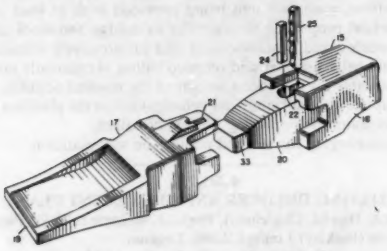
EXCAVATING TOOTH

Kerwin L. Davis, Meridian, Miss., assignor to Esco Corporation, Portland, Oreg.

Continuation-in-part of Ser. No. 769,857, Feb. 18, 1977, abandoned. This application Dec. 4, 1978, Ser. No. 966,517

Int. Cl.³ E02F *9/28*

U.S. Cl. 37—142 R **4 Claims**



1. In an excavating device having a front end loader bucket, a plurality of teeth secured to said bucket and projecting forwardly therefrom, each of said teeth including an adapter fixed to said bucket and equipped with a forwardly projecting nose, a point releasably mounted on said nose, said point including a relatively elongated metal body having a transverse penetrating edge at the forward end and an adapter nose-receiving socket at the rear end, said socket being defined by top, bottom and sidewalls in said body corresponding to confronting walls on said nose with said socket top and bottom walls being forwardly convergent and said socket walls terminating forwardly in a generally box-shaped apex providing generally parallel upper and lower apex surfaces, each upper and lower surface having a length dimension and a transverse dimension with the transverse dimension being parallel to said penetrating edge, said transverse dimension being approximately 2.5 times said length dimension, said upper and lower apex surfaces being vertically spaced apart to provide a transverse dimension to the spaced apart dimension in the ratio of approximately 1.8, each of said socket walls in the point being rearwardly extended to form integral ears, said adapter being equipped with recesses to receive said ears, the ears associated with said top and bottom walls being equipped with aligned openings for the receipt of a lock means, said adapter being equipped with a vertically extending opening aligned with said ear openings, and a lock means removably mounted in the said aligned openings.

4,231,174

PROTECTIVE HOLDER FOR SHEET MATERIAL

Earl C. Thompson, Drawer A, Hewitt, Tex. 76643

Filed Nov. 21, 1977, Ser. No. 853,230

Int. Cl.³ G09F *3/18*

U.S. Cl. 40—10 A **13 Claims**

1. In combination with a support member, a protective holder for sheet material comprising

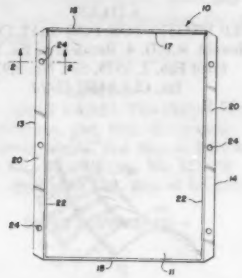
a flat rectangular envelope having three closed edges and one open edge; at least one wall of said envelope being fabricated from a transparent material;

said envelope having elongated mounting margins at opposite side edges thereof; said mounting margins each having a plurality of longitudinally spaced mounting apertures;

said mounting apertures including two spaced pairs, each pair including apertures adjacent to adjacent corners thereof;

tie means for securing said envelope to said support member, including a plurality of support cords mounted on said member in parallel relation to each other;

said envelope disposed in generally overlying relation to said member, with each aperture pair disposed for coacting relation with a respective cord pair; one cord of each cord



pair passing through one mounting aperture of a respective aperture paid and overlying one face of said envelope, in the same manner; and the other cord of each cord pair passing through the other mounting aperture of a respective aperture paid and overlying the other face of said envelope, in the same manner; said cord pairs and said envelope aperture pairs coacting to enable said envelope to be flip-flopped relative to said support member and to said support cords.

4,231,175

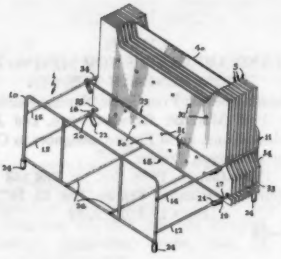
VARIABLE-VISIBILITY FILING SYSTEM

Kenneth W. Baxter, N. Hollywood, Calif., assignor to Baxter Associates, Inc., Burbank, Calif.

Filed May 30, 1978, Ser. No. 910,236

Int. Cl.³ G09F *19/00*

U.S. Cl. 40—374 **10 Claims**



1. A variable-visibility information storage and retrieval system for holding and displaying information cards between file segregators, comprising;

a multiplicity of generally planar file segregators having top, bottom and side edges;

enclosure means for supporting and retaining said file segregators in a row, one in front of another, said enclosure means having front and back ends;

engaging means for releasably securing said file segregators to said enclosure means, said engaging means comprising a first pair of parallel rails mounted to the enclosure means longitudinally with respect to the row of segregators, and notches defined in the edges of said segregators releasably and slidingly engaging said rails; and

compression means for controllably bending and fanning said file segregators, said compression means comprising separate, spaced lower and upper independently adjustable compressors mounted to said enclosure means and controllably compressing said segregators together against one end of said enclosure means along a first line near said bottom edges and along a second line more distant from said bottom edges, respectively.

4,231,176
VISIBLE INDEXES

Keith Ryan, 121 Parkside Way, Harrow, Middlesex, HA2 6DB, England

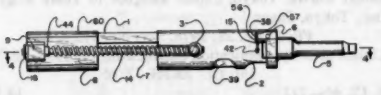
Filed Jun. 12, 1978, Ser. No. 914,866
Claims priority, application United Kingdom, Jun. 15, 1977, 25063/77; Nov. 11, 1977, 47141/77; Apr. 12, 1978, 14334/787
Int. Cl.³ G09F *7/22*
U.S. Cl. 40—395 **6 Claims**

1. A visible index comprising a plurality of carriers each comprising an elongate substantially V-shaped channel portion having an apex, a record retaining flange extending inwardly towards the apex of the channel, and a spacer portion which projects beyond the apex of the channel, each said carrier being dimensioned to internest in the channel portion of an identical carrier, in combination with a plurality of records each having an upper edge portion folded over to provide a hook portion which is hooked on to the retaining flange of a respective carrier, the carriers being arranged one above the other in internested relationship so that the records hooked thereon are arranged in overlapping array and are further inhibited from detachment from a retaining flange by the records being between the inner surface of the channel to which it is attached and the outer surface of the carrier therebeneath.

4,231,177
AUTOMATIC AND SEMIAUTOMATIC SMALL CALIBER CONVERSION SYSTEM

John P. Foote, Marietta, Ga., assignor to U.S. Armament Corporation, Gretna, La.

Division of Ser. No. 627,743, Oct. 31, 1975, Pat. No. 4,098,016. This application Jun. 22, 1978, Ser. No. 917,917
Int. Cl.³ F41C *11/00*
U.S. Cl. 42—16 **1 Claim**



1. In an adapter for converting a firearm adapted for automatic feed of ammunition, the firearm having a firearm receiver with a first and second end and a firearm barrel extending from the second end, the adapter having a fixed adapter receiver with a first portion located at the first end of the firearm receiver and a barrel insert at the second end of the firearm receiver, the barrel insert extending into the firearm barrel, the improvement comprising:

connection means for loosely pinning the barrel insert to the adapter receiver for permitting the barrel insert to center in the firearm barrel;

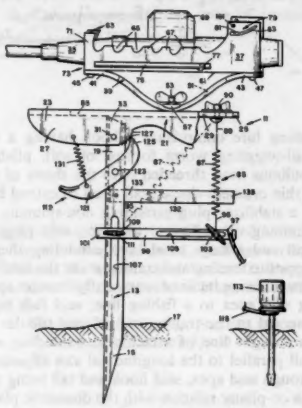
a rail on the adapter receiver having a hole therethrough; the barrel insert having a groove therein sized to receive said rail and having a hole therethrough; and

a pin fitting through said holes with said pin having a tight fit with the barrel insert and a loose fit with said rail.

4,231,178
AUTOMATIC FISH SNATCHER

Donald L. Black, Rte. 29, Trotter Rd., Knoxville, Tenn. 37920

Filed Nov. 29, 1978, Ser. No. 964,629
Int. Cl.³ A01K *91/06*
U.S. Cl. 43—16 **3 Claims**



1. A hook setting apparatus which supports a fishing rod connected to a hook through a fishing line and automatically jerks the rod in a direction opposed to the direction a fish tugs on the line such that the hook is set in the fish's mouth, said apparatus comprising:

a first support member having a first end portion and a further end portion,

a second member pivotally mounted on said further end portion of said support member,

rod holder means mounted on said second member and proportioned for receiving and supporting the handle portion of a rod therein,

a tension spring assembly biasing said second member in a predetermined pivotal direction for setting the hook in a fish's mouth, said tension spring assembly includes a tension spring secured at one of its end portions to said second member and secured at its opposite end to said first support member, the position of at least one end of said tension spring being adjustable for varying the biasing force against the second member;

audible alarm means comprising an elongated arm defining a first end portion secured to said first support member said arm extending outwardly in a cantilevered manner from said support member and defining an opposite end portion which frictionally engages the tension spring of said tension spring assembly whereby the rubbing of said spring against said arm generates an audible alarm responsive to the contraction of said spring; and

a trigger assembly which maintains said second member in a predetermined pivotal position by counteracting the forces applied to said second member by said tension spring assembly, said trigger assembly releasing said sec-

ond member responsive to said second member being pivoted by a fish in a direction opposite to the pivotal direction said second member is urged by said tension spring assembly such that said rod holder and rod are pivoted in a direction opposite to the direction said pole is jerked by a fish whereby said hook is set in the fish's mouth.

4,231,179

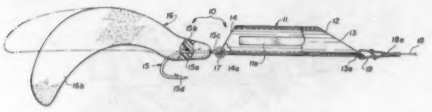
COMBINATION TAIL-WIGGLING ARTIFICIAL BAIT AND STABILIZER PLUG

Gene G. Hillesland, 275 NE. 9th St., Homestead, Fla. 33030

Continuation-in-part of Ser. No. 899,715, Apr. 24, 1978, abandoned. This application Aug. 6, 1979, Ser. No. 63,995

Int. Cl.³ A01K *85/00*

U.S. Cl. 43—42.06 **5 Claims**



1. A fishing lure comprising a hook having a shank, an artificial tail-wiggling worm formed of soft, pliable plastic having a bulbous head threaded onto the shank of said hook and a flat, thin crescent-shaped tail sized to extend behind the hook, and a stabilizer plug providing non-spinning and non-surface-skimming capability to the lure, said plug having a tubular wall and a large axial bore extending therethrough between opposite leading and trailing ends, the leading end of the tubular wall being inclined rearwardly from an apex, means connecting said apex to a fishing line, said fish hook shank being connected to the trailing end of said tubular wall at a point on a straight line of attachment extending along said tubular wall parallel to the longitudinal axis of said bore and passing through said apex, said hook and tail being orientated to extend in co-planar relation with the diametric plane of said straight line of attachment of said plug, the hook curving away from the plug and the tail being co-planar with the hook, said plug being self-orientating below the surface of the water with the straight line of attachment located on the underside of the plug and disposing said planes vertically when the lure is pulled through the water enabling the crescent shape of said tail to straighten causing undulation and lateral swinging of the tail as fish attracting motion.

4,231,180

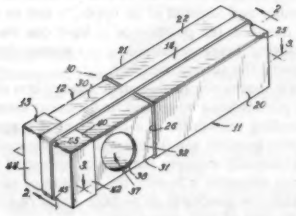
DISPOSABLE ANIMAL TRAP

W. Wayne Bare, R.R. #2-Beal Rd., Princeville, Ill. 61559, assignor to W. Wayne Bare, Wyoming, Ill.

Filed Oct. 25, 1978, Ser. No. 954,431

Int. Cl.³ A01M *23/02*

U.S. Cl. 43—61 **5 Claims**



1. A trap for the live entrapment of small animals, such as mice, comprising: a pair of co-axially interfitting hollow members, namely, a hollow plunger member and a hollow housing member; said plunger member being walled on all sides to provide an internal entrapment chamber substantially enclosed except for an animal entrance opening through one side thereof; said housing member being enclosed on all sides except for one open end through which said plunger member is removably received; said members having mating cross-sectional configurations whereby said plunger member fits closely within the interior of said housing member for co-axial sliding movement therealong and whereby said animal entrance is closed by an opposing wall of said housing member as said plunger member moves into said housing member; thrust imposing means engaging the exterior of said two members and operable to move said plunger member rapidly into said housing member, one-piece trigger means comprising an elongated member mounted to extend between the closed end of said housing member and the interior of said entrapment chamber; and detent means cooperating with said trigger means and plunger member to releasably hold the latter in position for thrust imposed movement into said housing member when released from said detent means, said plunger member when in said position having said animal entrance opening therein accessibly located outwardly of said housing member.

4,231,181

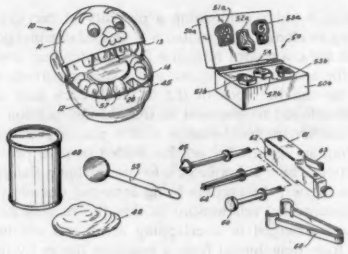
DENTAL TOY

Norman Fabricant, 94-19 64th Rd., Rego Park, N.Y. 11374

Filed Mar. 5, 1979, Ser. No. 17,306

Int. Cl.³ A63H *13/00*

U.S. Cl. 46—116 **12 Claims**



1. A dental toy comprising:
(a) at least one simulated jaw,
(b) a series of tooth-retaining means carried by said jaw,
(c) means for making soft and moldable simulated teeth cooperable with said tooth-retaining means, and
(d) at least one simulated dental tool for operating on a simulated tooth to alter the contour of the tooth while it is retained by said retaining means,

whereby the toy can be used to simulate drilling, filling, and other dental work performed by a dentist on real teeth.

4,231,182

TOY VEHICLE HAVING REVERSING MECHANISM

Toshiaki Kurita, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan

Filed Dec. 21, 1978, Ser. No. 972,018

Claims priority, application Japan, Jun. 13, 1978, 53-71636

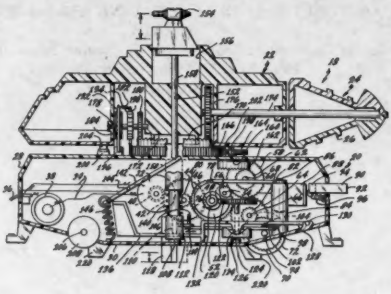
Int. Cl.³ A63H *17/40*

U.S. Cl. 46—212 **14 Claims**

1. A toy vehicle which comprises:
a vehicle body;
movable support means movably supporting said vehicle body on a support surface;
locomotion means including portions having relative movement with respect to each other for moving said vehicle along said support surface;

direction changing means operatively connected to said locomotion means for changing the direction of movement along said support surface by reversing the direction of said relative movement of at least a portion of said locomotion means;

said direction changing means including a switch means for controlling the direction of said movement, said switch means having at least two positions, a first of said positions corresponding to the movement of said vehicle in one direction and a second of said positions corresponding to movement of the vehicle in another direction, said switch means moving between said positions in response to stimu-



lation of said switch means by a stimulus external to said vehicle body;

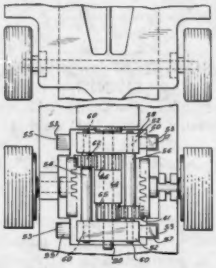
exposure means for exposing said switch means alternately between an exposed position, wherein said switch means can be acted upon by said stimulus external to said vehicle body changing the direction of movement of said vehicle body in response to movement of said switch means between said first of said positions corresponding to the movement of the vehicle in one direction and said second of said positions corresponding to movement of the vehicle in another direction, and a protected position wherein said switch means cannot be acted on by said stimulus to change the direction of movement of said vehicle.

4,231,183

DIFFERENTIAL GEAR DRIVE

Robert G. Lahr, Reseda, Calif., assignor to Ideal Toy Corporation, Hollis, N.Y.

Filed Jun. 22, 1979, Ser. No. 51,260
Int. Cl.[3] A63H *17/36, 18/12;* A63F *9/14*
U.S. Cl. 46—262 **13 Claims**



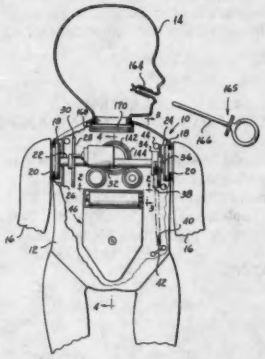
5. In a toy vehicle including a frame, a body mounted on said frame, a plurality of ground engaging wheels mounted in said frame and including a pair of drive wheels; means for mounting said drive wheels in said frame for rotation in laterally spaced vertical planes; a reversible electric motor mounted in said frame having an output shaft and drive transmission means mounted in said frame for drivingly connecting said motor output shaft to the respective drive wheels, wherein the improvement comprises said transmission means including a transmission frame movably mounted in the vehicle frame for movement between first and second positions in response to the direction of rotation of the output shaft, a pair of idler gears mounted on the transmission frame for rotation therewith and positioned to selectively drivingly engage said drive wheels in said first and second positions of said transmission frame; and a pair of gear elements rotatably mounted in said transmission frame in respective driving engagement with said idler gears and drivingly engaged with said output shaft; said gear elements having different numbers of gear teeth whereby during operation of said motor both of said drive wheels are driven but one drive wheel will be driven at a great rotary speed than the other depending upon the direction of rotation of said output shaft.

4,231,184

REMOTE-CONTROL DOLL ASSEMBLY

Charles J. Corris, Irmo; Charles M. Hollingsworth, West Columbia; Witold W. Kosicki, and Robert T. Potter, both of Columbia, all of S.C., assignors to Horsman Dolls Inc., Columbia, S.C.

Filed Jul. 7, 1977, Ser. No. 813,499
Int. Cl.[3] A63H *11/00*
U.S. Cl. 46—265 **2 Claims**



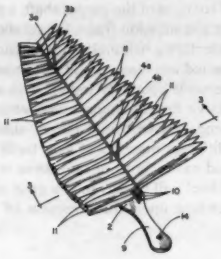
1. A remote-control-doll assembly including in combination a doll having arms and means for rotatably receiving said arms, a toy separate from said doll, selectively operable means on said toy for radiating a control signal, and means on said doll responsive to said control signal for actuating said doll to simulate a human action, said actuating means comprising a motor having a shaft, means for coupling said motor shaft to said arms, means responsive to said control signal for energizing said motor, an additional shaft coupled to at least one of said arms, a wheel carried by said additional shaft having a grooved rim, a fixed limit stop disposed so as to abut said wheel at the limits of a predetermined arc to limit the angular movement of said arms, and a spring having one end secured to said wheel, said spring wrapping around said rim as said additional shaft is rotated to exert a torque on said shaft.

4,231,185

FOLIAGE GUIDE

Jerry Adams, 2003 Waterloo Rd. A-12, Cedar Fall, Iowa 50613

Filed Sep. 25, 1978, Ser. No. 945,204
Int. Cl.³ A01G *3/08, 5/00*
U.S. Cl. 47—1 R **3 Claims**



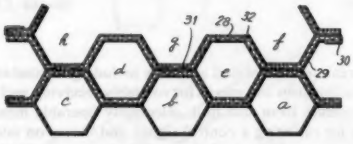
1. A foliage guide for holding one or more pieces of central stem supported foliage, such as palm leaves or ferns for floral trimming, comprising elongated support means, a first guide having a set of closely spaced elongated rodlike posts fixed to the support means, and a second guide having a set of closely spaced elongated rodlike posts fixed to the support means with both guides being symmetrically disposed along a longitudinal centerline of the support means with the posts of each guide set being fixed closely adjacent the centerline and being substantially removed from the elongated edges of the support means and so spaced to confine substantially all central stems from lateral movement and with both guides being substantially separated from one another to receive and closely guide between the two sets of posts one or more of the stems carrying foliage, with substantial portions of the foliage projecting beyond the support means so that it may be cut away from the support means, and a handle fixed to the support and extending beyond the portion of the support carrying the two sets of guide posts.

4,231,186

GROUP OF POTS FOR NURSING AND REPLANTING PLANTS

Mauno Ruuska, Säkylä, Finland, assignor to Lannen Tehtaat Oy, Iso Vimma, Finland

Continuation of Ser. No. 804,568, Jun. 8, 1977, abandoned. This application Apr. 16, 1979, Ser. No. 30,007
Claims priority, application Finland, Jun. 9, 1976, 761655
Int. Cl.³ A01G *23/02*
U.S. Cl. 47—74 **8 Claims**



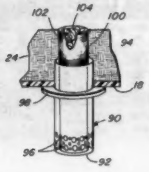
1. A group of adjoining enclosures for nursing and replanting plants comprising a plurality of parallel rows of enclosures, each of said enclosures formed by the union of two wall layers of non-woven fabric consisting essentially of a highly porous network of artificial fiber, and separated in the region between adjoining enclosures in one row by said wall layers superimposed and permanently bound to each other, one of said wall layers of one parallel row separated from an adjacent wall layer of an adjacent parallel row by an intermediate layer of decomposable material laminated to the outer layers of non-woven fabric to form a laminated wall construction, said outer fabric layers of the laminated wall construction being decomposable upon exposure to soil and water during the nursing stage of said plants at a slower rate than said intermediate layer, and wherein the ends of the outer layers at one end of each laminated wall construction are permanently fastened to each other, and wherein the fastening points of the laminated wall constructions at the ends of two adjoining wall constructions are always placed at opposite sides of the group of enclosures so that a single chain of enclosures is formed after said intermediate layer has decomposed.

4,231,187

AGRICULTURAL DEVICE HAVING AIR-WATER-SOIL STRATA

George Greenbaum, 790 Boylston St., Boston, Mass. 01299

Filed Nov. 17, 1978, Ser. No. 961,669
Int. Cl.³ A01G *27/00*
U.S. Cl. 47—80 **4 Claims**



1. An agricultural device which comprises
(a) a reservoir having a base and sides adapted to receive a strata of water;
(b) a soil bed having a fluid permeable floor and walls defining a stratum of soil and defining between the soil stratum and the water stratum an air stratum, each distinct from the other;
(c) a sheath-like cylindrical column, the lower end thereof being fluid permeable and received in the base of the reservoir, the column including a flange secured thereto and supportingly engaging the floor, the column extending through the floor and into the soil bed, the column including an open upper end lying in a plane substantially parallel to the floor
a removable porous walled cartridge member received in the column in non-sealing engagement therewith, the cartridge member comprising hydrophilic material and extending from the bottom of the column to beyond the upper end of the column whereby water is transferred through the cartridge member at a rate and amount dependent upon the material in the cartridge member into the soil bed.

4,231,188

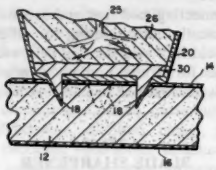
METHOD AND SYSTEM FOR PROPAGATING OF PLANTS

John J. McGuire, 37 Earles Court Rd., Narragansett, R.I. 02882, and Edward J. Auger, 1301 Bald Hill Rd., Warwick, R.I. 02886

Filed Dec. 26, 1978, Ser. No. 972,812
Int. Cl.³ A01G *27/00*
U.S. Cl. 47—80 **10 Claims**

1. A plant growing system which comprises:
a. a layer of inert water-transmitting particles,
b. said layer of particles being supported on a water-impermeable support,
c. a sheet of opaque, water-impermeable plastic positioned to cover the top surface of said layer of particles,
d. means for delivering water into said layer of particles, and
e. at least one container housing a plant having at least one

hollow prong extending from the bottom of said container, said prong having a length to permit extension into



said layer of particles without contacting the water-impermeable support.

4,231,189

PLANT GROWING ASSEMBLY

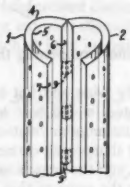
Mordecai Hochberg, Old Kfar-Aharon near Ness-Ziona, Israel

Filed Oct. 2, 1978, Ser. No. 947,514

Claims priority, application Israel, Oct. 27, 1977, AD.50469; Nov. 28, 1977, AD.50469

Int. Cl.³ A01G *9/02*

U.S. Cl. 47—83 **2 Claims**



1. A plant growing assembly comprising two upright sections, each section comprising a generally semi-cylindrical perforate outer wall and a generally semi-cylindrical perforate inner wall spaced therefrom, each said wall having opposite, side edges, means joining each side edge of said inner wall to a corresponding said side edge of said outer wall, said sections being arranged in juxtaposed parallel positions with said side edges of one section engaged with corresponding respective side edges of the other said section whereby said inner walls define a central fertilizer chamber and said inner and outer walls define therebetween an annular soil chamber outwardly around said fertilizer chamber, and hinge means connecting a side edge of the outer wall of said one section to the corresponding side edge of the outer wall of said other section whereby said sections are swingable apart to open said fertilizer chamber.

4,231,190

REMOTELY CONTROLLED GATE OPENER

James Tieben, Dodge City, Kans., assignor to My-D-Han-D Manufacturing Co., Dodge City, Kans.

Filed Oct. 4, 1978, Ser. No. 948,388

Int. Cl.² E05F *15/20*

U.S. Cl. 49—25 **14 Claims**

1. A remotely controlled gate opener for use with a gate pivotably mounted to a gate support structure, said gate opener comprising:

a frame mounted adjacent the gate support structure;

a motor mounted on the frame;

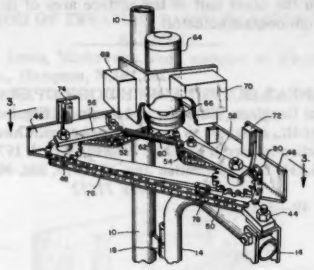
a drive member rotatably driven by the motor;

a positioning member mounted on the frame;

a closed loop drive linkage mounted around the drive member and the positioning member, said drive linkage drivingly engaged with the drive member such that the motor operates to propel the drive linkage;

means for maintaining the drive linkage in tension;

means for attaching the drive linkage to the gate at a point spaced from the pivot axis of the gate such that the gate causes the attaching means to move along a curved line as



the gate pivots, thereby causing the contour of the drive linkage to change as the gate pivots; and

remotely controlled switching means for selectively activating the motor to open and close the gate.

4,231,191

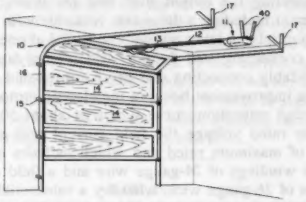
AUTOMATIC DOOR OPENER SYSTEM

John W. Ellmore, West Chester, Pa., assignor to Challenger. Inc., Greenbrook, N.J.

Filed Jun. 12, 1978, Ser. No. 914,420

Int. Cl.³ E05F *15/10*

U.S. Cl. 49—28 **12 Claims**



1. A door opener system, which includes,

a pair of guide rails disposed in parallel relationship with each other,

adjustable bracket means movable along the guide rails for mounting said guide rails to a structure,

a compact unit having a motor with a driving gear extending therefrom,

means for removably connecting the compact unit to the guide rails so that the driving gear meshes with the driven gear,

a chain driven means unit cooperatively associated with the driven gear and operative in response to the operation of said driven gear,

trolley means connected to the chain driven means for quick release from the chain driven means and manually operable in case of a power failure,

a draw bar unit interconnecting the chain driven means unit to a door to be opened and closed, and

electromechanical means connected to the system frame and cooperatively associated with the chain driven means unit for controlling the operation of the motor for starting and stopping the chain driven means unit, said electromechanical means including a pair of switches, each switch having a contact actuator therefor; a cam actuator operative in alternate first and second positions and having respective first and second actuator contacting surfaces, each actuator contacting surface movable into engagement

with one-half of the surface area of its respective switch contact actuator; and, a load responsive lever operative in alternate first and second positions, and having first and second actuator contacting surfaces, each of the aforesaid actuator contacting surfaces movable into engagement with the other half of the surface area of its respective switch contact actuator.

4,231,192

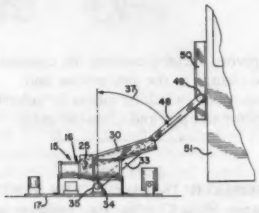
LINEAR OUTPUT FORCE DOOR OPERATOR

Kristupas Daugiras, Wilmette, and Samir M. Elguindy, Roselle, both of Ill., assignors to Vapor Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 794,842, May 9, 1977, Pat. No. 4,134,231. This application Jan. 12, 1979, Ser. No. 2,887

Int. Cl.³ E05F *11/12*

U.S. Cl. 49—363 **21 Claims**



1. In a door operator for driving a door between open and closed positions which operator includes a series wound electric motor driving an output shaft and a linkage arrangement interconnecting the output shaft and the door, the linkage arrangement including a drive arm rotatable with said output shaft, a multiplying lever pivotally mounted at one end, means slidably connecting said door to said multiplying lever and means slidably connecting said drive arm to said multiplying lever, the improvement being in the electric motor having an open circuit saturation curve where at about 50 percent of maximum rated voltage the field current will be about 40 percent of maximum rated and which includes an armature with ten windings of 24-gauge wire and a field of 40 to 80 windings of 26-gauge wire, whereby a substantially constant force is applied to the door by the operator between the open and closed positions.

4,231,193

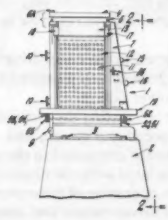
VERTICAL BELT SANDING APPARATUS

John R. Siegel, 4444 Burnley Dr., Bloomfield Township, Oakland County, Mich. 48013

Filed Dec. 22, 1978, Ser. No. 972,476

Int. Cl.³ B24B *21/00*

U.S. Cl. 51—141 **8 Claims**



1. A vertical belt sanding apparatus comprising:

a plurality of roller means for supporting a sanding belt;

each said roller means being provided with antifriction bearing means at each end thereof;

a first said roller means being supported by a first frame member;

a second said roller means being supported by a second frame member;

means for connecting said first and second frame members for automatically compensating for differences in length across the width of said sanding belt; and

vacuum means for firmly holding a moving sanding belt against a platen attached to said first frame member.

4,231,194

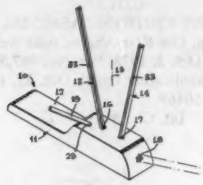
BLADE SHARPENER

Louis S. Glesser, P.O. Box. 800, Golden, Colo. 80401

Filed Jan. 2, 1979, Ser. No. 62

Int. Cl.³ B24B *3/54*

U.S. Cl. 51—211 R **6 Claims**



1. A blade sharpener comprising the combination of:

a base;

a pair of relatively wide and flat but elongated sharpening elements mounted in said base to extend upwardly from said base in acute angular relationship to said base;

said wide and flat sharpening elements lying in substantially the same plane, and the acute angle between each rod and said base being the same as that of the other one of said elements and said base;

each of said elements leaning in an opposite direction from said base, wherein said elements are mounted in said base in spaced diverging relation to each other and wherein upper portions of said elements terminated in spaced apart relationship;

each of said sharpening elements includes at least two broad, flat surfaces extending along opposite sides thereof;

said element includes a grooved slot of V-shaped cross section provided in a selected one of said broad, flat surfaces mid-way between the opposite sides of said selected element;

each of said elements includes a triangular cross section and said base includes a pair of openings diverging outwardly with respect to each other for insertably receiving each of said elements respectively; and wherein;

each of said openings is configured to correspond to said triangular cross of each of said elements, and

each of said openings is configured to present a six-sided star so that each of said elements may assume a position of opposing flat surfaces or opposing corner edges.

4,231,195

POLYCRYSTALLINE DIAMOND BODY AND PROCESS

Robert C. DeVries, Burnt Hills; Minyoung Lee, Schenectady; Lawrence E. Szala, Scotia, and Roy E. Tuft, Albany, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed May 24, 1979, Ser. No. 42,237

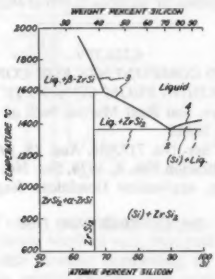
The portion of the term of this patent subsequent to May 1, 1996, has been disclaimed.

Int. Cl.³ B24D *3/02*

U.S. Cl. 51—307 **10 Claims**

1. A process for preparing a polycrystalline diamond body which consists essentially of confining within a reaction chamber a charge composed of solid eutectiferous silicon-rich alloy,

or solid components for providing eutectiferous silicon-rich alloy, and a mass of diamond crystals in contact with said mass of solid eutectiferous silicon-rich alloy, or with at least one of said components for providing eutectiferous silicon-rich alloy, and hexagonal boron nitride in contact or in association with said alloy or with at least one of its components, said eutectiferous silicon-rich alloy consists essentially of silicon and a metal which forms a silicide with said silicon and which is selected from the group consisting of cobalt, chromium, iron, hafnium, manganese, molybdenum, niobium, nickel, palladium, platinum, rhenium, rhodium, ruthenium, tantalum, thorium, titanium, uranium, vanadium, tungsten, yttrium, zirconium and alloys thereof, said hexagonal boron nitride being present in an amount of at least about 5% by weight of the mass of diamonds, applying a pressure of at least about 25 kilobars to said confined charge compressing the mass of diamond crystals to a density higher than 90% by volume of the resulting compressed means of diamond crystals, maintaining said applied pressure, heating the pressure-maintained charge to an infiltration temperature sufficient to melt said alloy and at which no significant graphitization of the diamond occurs whereby said alloy is infiltrated through the interstices between said compressed means of diamond crystals, said alloy being used in an amount sufficient to fill the interstices of said compressed mass of diamond crystals, said infiltrating silicon-rich alloy encapsulating the surfaces of the compressed diamond crystals reacting with diamond surfaces or any non-diamond elemental carbon producing a carbide which at least in major amount is silicon



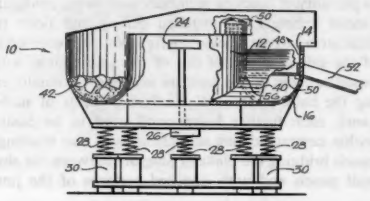
carbide, ceasing the input of heat into the resulting infiltrated diamond mass, removing said pressure and recovering the resulting polycrystalline diamond body comprised of diamond crystals bonded together by a silicon atom-rich bonding medium wherein the diamond crystals are present in an amount ranging from at least 90% by volume up to about 95% by volume of the total volume of said body.

5. A polycrystalline diamond body consisting essentially of a mass of diamond crystals adherently bonded together by a bonding medium consisting essentially of silicon carbide and a carbide and/or silicide of a metal component which forms a silicide with silicon, said metal component of said metal silicide being selected from the group consisting of cobalt, chromium, iron, hafnium, manganese, molybdenum, niobium, nickel, palladium, platinum, rhenium, rhodium, ruthenium, tantalum, thorium, titanium, uranium, vanadium, tungsten, yttrium, zirconium and alloys thereof, said metal component of said metal carbide being selected from the group consisting of chromium, hafnium, titanium, zirconium, tantalum, vanadium, tungsten, molybdenum and alloys thereof, said diamond crystals ranging in size from about 1 micron to about 1000 microns, the volume of said diamond crystals ranging from at least 90% by volume up to about 95% by volume of said body, said bonding medium being present in an amount ranging up to about 10% by volume of said body, said bonding medium being distributed at least substantially uniformly throughout said body, the portion of said bonding medium in contact with the surfaces of said diamond crystals being at least in a major amount silicon carbide, said diamond body being at least substantially pore-free.

4,231,196
METHOD OF TREATING PARTS BY VIBRATORY ACTION

George F. Jones, Mishawaka, Ind., assignor to Wheelabrator-Frye Inc., Hampton, N.H.

Division of Ser. No. 887,758, Mar. 17, 1978, Pat. No. 4,161,848, which is a continuation of Ser. No. 748,953, Dec. 9, 1976, abandoned. This application Mar. 26, 1979, Ser. No. 24,119
Int. Cl.[3] B24B 1/00
U.S. Cl. 51—313 1 Claim



1. A method of treating the surface of parts comprising introducing said parts and a finishing media into a first zone at normal level, subjecting said mixture of parts and media to vibratory action whereby said parts and media travel in one direction in an orbital path, introducing a barrier across the path of travel of the parts and media whereby the parts and media pile up in advance of the barrier to an upper level above the normal level to clear the barrier, allowing the parts and media to fall sharply from the upper level to a lower level below normal level upon clearance of the barrier, screening the parts and media immediately beyond the barrier at a level below normal level but above the lower level to separate the parts on the surface of the screen while enabling the media to pass therethrough for return to normal level.

4,231,197
BUILDING SYSTEM EMPLOYING PREFABRICATED WALL PANELS

Sidney W. Caplan, Mayfield, and William N. Molson, Cleveland, both of Ohio, assignors to Component Systems, Inc., Cleveland, Ohio

Filed Feb. 21, 1978, Ser. No. 879,194
Int. Cl.[2] E04H 1/00; E04B 2/72
U.S. Cl. 52—36 37 Claims

22. A system for forming a wall of a building which has preexisting floor and ceiling structures, the system comprising:

(a) a plurality of substantially dimensionally identical, substantially rectangular, wall panels each including a pair of facing sheets secured to and held in spaced relationship by spacer means, the facing sheets each having front and back surfaces interconnected by top and bottom end surfaces and by first and second opposed side surfaces, the facing sheets of each panel extending in overlying relationship with their associated side and end surfaces being aligned and cooperating to define top and bottom ends and first and second sides of their wall panel, the spacer means of each wall panel extending between the back surfaces of the associated facing sheets at positions spaced inwardly from the aligned side surfaces of the facing sheets whereby first and second sidewardly facing channels are provided along the first and second sides of each wall panel, such wall panels being installable side-by-side to form a substantially continuous wall;

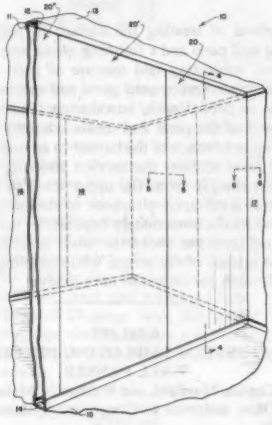
(b) preformed ceiling and floor runner structures, wherein:

(i) the ceiling runner structure being configured to be secured to the ceiling structure, being configured to

receive the top end region of at least one of the wall panels, and having a pair of depending portions configured to extend from the ceiling structure to positions overlying top portions of the front surfaces of both facing sheets on such wall panel;

(ii) the floor runner structure being configured to be secured to the floor structure, being configured to receive the bottom end of at least one of the wall panels, having supporting formations adapted to support the bottom end of such wall panel at a position above the floor structure, and having a pair of upwardly extending portions adapted to extend from the floor to positions overlying bottom portions of the front surfaces of both facing sheets on such wall panel;

(c) a plurality of juncture members, each being configured to extend between the installed ceiling and floor runner structures and each being configured to be received in one of the side channels of one of the wall panels, with opposed surfaces of the juncture member frictionally engaging the back surfaces of the facing sheets of such wall panel, each further being configured to be positioned within communicating side channels of two abutting wall panels bridging the plane of juncture between the abutting wall panels and with opposed surfaces of the juncture



member frictionally engaging the back surfaces of the facing sheets of both abutting wall panels.

(d) the spacer means comprising a plurality of elongate spacer members extending between the facing sheets of their associated panel and cooperating to support such facing sheets in spaced, rigidly interconnected, overlying relationship, the spacer members extending parallel to the sides of the panels;

(e) the spacer members within each panel including a pair of outer spacers which are inset from the two sides of the panel and which cooperate with back surfaces of the facing sheets to define first and second side channels between the facing sheets, and at least one inner spacer located between the outer spacers;

(f) the at least one inner spacer being located at different distances from the two sides of its panel such that, if less than a full panel width is needed to complete a wall being built, and if the required panel width as measured from one of the panel's sides causes a proposed line-of-cut to intersect such at least one inner spacer, then such line-of-cut can be repositioned by measuring the required panel width from the opposite panel side, and such repositioned line-of-cut will no longer intersect such at least one inner spacer.

4,231,198

JOINTING DEVICE FOR LONG-LIMBED FRAMEWORK ELEMENTS IN REINFORCED CONCRETE AND FRAMEWORK COMPRISING FRAMEWORK ELEMENTS JOINTED BY SUCH DEVICES

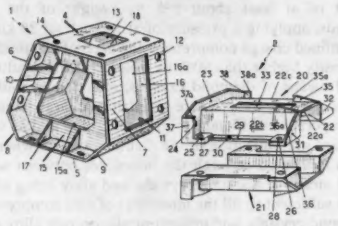
Robert Augier; Jean P. Carbonari, both of Sorgues, and Jean Eliche, Les Angles, all of France, assignors to Societe Anonyme de Recherche et d'Etudes Techniques, Le Pontet, France

Filed Dec. 21, 1978, Ser. No. 971,842

Claims priority, application France, Dec. 29, 1977, 77 39653

Int. Cl.[3] E04B *7/02, 7/12*

U.S. Cl. 52—91 **37 Claims**



1. A device for jointing together at least two reinforced concrete long-limbed construction elements or sections, comprising a body, at least two sleeves connected to said body, and means for tightening said sleeves so as to respectively clamp construction elements or sections therebetween.

4,231,199

METHOD AND COMPONENTS FOR CONSTRUCTION OF BUILDING FROM CONCRETE SLABS

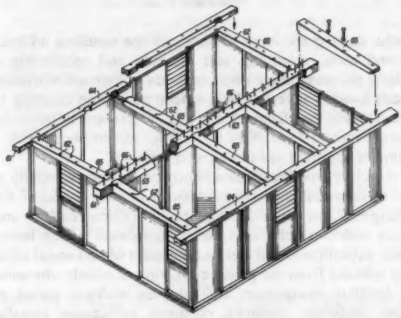
Nicolas Q. Gomez, and Raul Martin, both of P.O. Box 8157, Santurce, P.R. 00910

Continuation of Ser. No. 717,684, Aug. 25, 1976, abandoned. This application Feb. 8, 1978, Ser. No. 876,177

Claims priority, application Dominican Republic, Aug. 26, 1975, 2313

Int. Cl.[2] E04B *7/04, 1/04*

U.S. Cl. 52—91 **25 Claims**



1. A single story building which comprises: a plurality of load-bearing walls each consisting of a plurality of pre-cast concrete load-bearing wall panels; said wall panels having substantially identical horizontal cross-sections and having substantially thicker portions in their vertical edges than between said portions; a substantially horizontal concrete framework which continuously defines on its lower side longitudinally disposed channels receiving the upper edges of said wall panels of said plurality of walls; said wall panels being assembled in an overlapping relationship and alternately offset relative to the longitudinal horizontal centerline of said wall in

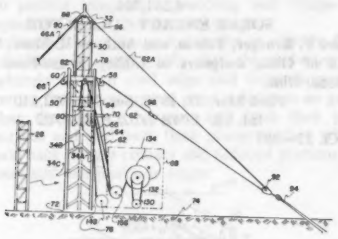
which they are contained and overlapping with adjacent wall panels in the same wall whereby a vertical plane may be received in each said wall of the building whereby said wall panels are alternately spaced from said plane except at said vertical edge portions which are overlapping, said edge portions of all said wall panels being intersected by said plane; a substantially horizontal floor slab which continuously defines recesses in its upper side, said recesses being spaced vertically directly under and corresponding to said channels, said wall panels having their lower edges secured to said floor slab in said recesses and their upper edges secured to said framework in said channels; a roof secured on top of said concrete framework; said recesses and said channels for each corresponding wall comprised of wall panels secured therein continuously receiving said vertical plane for said corresponding wall; said roof and said framework being substantially entirely supported from said slab by said wall panels.

4,231,200

METHOD AND APPARATUS FOR ASSEMBLING A PORTABLE TOWER

Dennis Henderson, c/o Netco Systems, S. Highway 36, Caddo Mills, Tex. 75005

Filed Apr. 17, 1978, Ser. No. 896,927
Int. Cl.[2] E04H *12/34*
U.S. Cl. 52—111 **3 Claims**



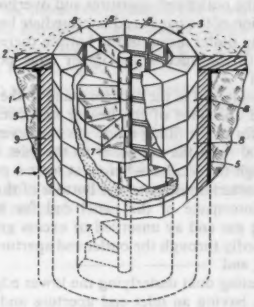
1. A sectional tower assembly comprising, in combination:
a plurality of tower sections each triangular in section;
an upright guide member comprising an elongate frame, triangular in section, having side portions enclosing a channel through which a tower section may be extended or retracted, each side of the elongate frame having a plurality of rollers mounted at vertically spaced locations near the upper end of the upright guide member for engaging the exterior of tower sections which are extended or retracted through the channel;
hoist means carried on said guide member for engaging the lower end of a first of each pair of successive tower sections for moving said first tower section to a first elevated position on the guide member to receive a second of each pair of successive tower sections in upright position beneath its lower end;
means engageable with the adjacent ends of successive tower sections for locking the successive tower sections together, end to end, prior to each successive extension of the tower;
a plurality of sheaves attached to the guide member;
a corresponding number of anchors symmetrically disposed at radially spaced locations relative to the guide member and a sheave attached to each anchor;
a winch; and,
a plurality of guy wires each having a first end portion attached to said upper tower section, a first intermediate portion coupled in reeved engagement with one of the anchor sheaves, a second intermediate portion coupled in reeved engagement with one of the tower sheaves, and a second end portion coupled to said winch,
said winch being operable to maintain a tension load on each guy wire as said assembled tower sections are extended or retracted relative to the guide member.

4,231,201

METHOD AND DEVICE FOR ARRANGING A STORAGE AREA

Georges A. Harnois, 22, rue des Paquerettes, 91540-Mennecy, France

Filed Sep. 20, 1978, Ser. No. 943,970
Claims priority, application France, Nov. 10, 1977, 77 33887
Int. Cl.[3] E04F *11/00*
U.S. Cl. 52—169.6 **11 Claims**



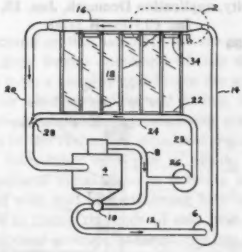
1. A method for constructing a cellar or storage area underneath an already existing building the foundation of which comprises a concrete flooring on which the building rests on the ground comprising the steps of:
making an opening through said concrete flooring to gain access to the earth below the building;
excavating a well in the earth through said opening in the concrete flooring;
introducing through said opening in said flooring a plurality of prefabricated storage bin elements which when assembled form an envelope comprising said storage area, and
assembling said prefabricated elements within said well to form said envelope conforming to the shape of said well.

4,231,202

DOUBLE-GLAZED BUILDING PANEL AND FILLING SYSTEM

Marcel Dube, 757 Cecile, Hawkesbury, Ontario, Canada K6A 1P2

Filed Dec. 22, 1978, Ser. No. 972,266
Claims priority, application Canada, Jan. 24, 1978, 295516
Int. Cl.[3] E04B *2/40*; E04C *1/42*; E06B *3/66*
U.S. Cl. 52—171 **10 Claims**



1. A double-glazed panel structure and a system for selectively filling and evacuating the panel structure with granular material comprising:

(a) a double-glazed panel structure having an interspace vertically extending at an angle exceeding the angle of repose of the granular material, an upper edge portion and a lower edge portion, and having an inlet in the upper edge portion and an outlet in the lower edge portion for the passage of the granular material in and out of the interspace respectively;

(b) a container for operatively storing the granular material;

(c) a duct-like header for the through flow of the gas conveyed granular material and the settling of at least a portion of the conveyed granular material, said header defining an inlet and an outlet end aperture in the opposite ends thereof and a bottom duct-like portion intermediate the inlet and the outlet end apertures and overlying the upper edge portion of the panel said intermediate bottom portion also having outlet means at the bottom thereof communicating with the inlet in the upper edge portion of the panel; and

(d) means connected to the container and to the inlet and the outlet end apertures of the header and constructed and arranged for in the filling mode gas conveying the granular material from the container to the inlet end aperture and through the header wherein at least a portion of the granular material settles to the bottom of the header and into the interspace of the panel and for returning the conveying gas and ay unsettled or excess granular material outwardly through the outlet end aperture back to the container; and

(e) an evacuating duct underlying the lower edge portion of the panel, having an inlet end aperture and an opposite outlet end aperture for the through flow of the conveying gas and also having aperture means in the top thereof communicating with the outlet in the lower edge portion of the panel; and

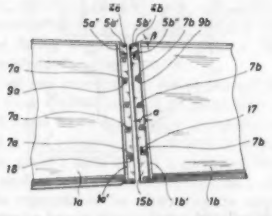
(f) controllable retaining means located between the outlet in the lower edge portion of the panel and the aperture means in the top of the evacuation duct for selectively retaining the granular material in the panel in the filling mode and for opening in the evacuating mode whereby the granular material is allowed to drain at a controlled rate in to the evacuation duct; and

(g) gas conveying means connected to the outlet end aperture of the evacuation duct and to the container whereby in the evacuating mode, upon operation thereof, air is admitted at the inlet end of the evacuation duct and flows through the evacuation duct conveying the granular material through the outlet end aperture of the evacuation duct back to the container.

4,231,203
UNIT JOINT FOR CONNECTING TWO ANGULARLY ARRANGED PANEL UNITS

Henrik Mikkelsen, Copenhagen, and Bjarne B. Andersen, Holte, both of Denmark, assignors to Inter-Ikea A/S, Humlebaek, Denmark

Filed Aug. 21, 1978, Ser. No. 935,177
Claims priority, application Denmark, Jun. 15, 1978, 2700/78
Int. Cl.[2] E04B *5/00*
U.S. Cl. 52—284 **10 Claims**

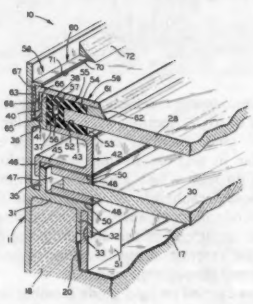


1. In combination: two panel units arranged at an angle with respect to each other, each panel unit having a relatively narrow edge surface and a wall surface projecting beyond said edge surface towards the other unit, each edge surface comprising at least one rib having an angle guide surface abutting the angle guide surface on a corresponding rib on the other panel unit so as to define a mutualangle at which said panel units abut, a plurality of coupling projections at said edge surfaces of each panel unit and at the wall surface of each panel unit, said projections having apertures substantially coaxially arranged, said projections on one unit projecting between the projections on the other panel unit, and a common locking rod extending through said apertures, each coupling projection being substantially rectangular and firmly connected to the narrow edge surface and wall surface of the respective panel unit, and substantially filling up the cross section of a channel defined by the narrow edge surfaces and wall surfaces when the angle guide surfaces on both panel units abut each other, each coupling projection having integrally connected thereto an auxiliary rib provided with an inclined auxiliary angle guide surface cooperating with a corresponding inclined auxiliary angle guide surface on a corresponding auxiliary rib on the other panel unit.

4,231,204
SOLAR ENERGY COLLECTOR

Wallace F. Krueger, Toledo, and Anthony R. Shaw, Waterville, both of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Mar. 31, 1978, Ser. No. 892,110
Int. Cl.[3] E04B *1/62;* **F24J** *3/02*
U.S. Cl. 52—397 **9 Claims**



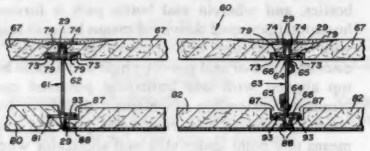
1. A solar energy collector comprising an enclosure including an outer peripheral wall having spaced first and second protrusions formed integral therewith, said protrusions having extensions generally parallel to said wall in spaced relation thereto, said first protrusion extension defining the end wall of a channel and terminating in an enlarged formation, a support member affixed to said second protrusion extension and having a supporting surface defining one side wall of said channel, at least one glazing panel within said enclosure, and detachable retainer means for securing said glazing panel in place and comprising a first element mechanically interlocked with said enlarged formation and having a portion defining the other side wall of said channel and overlying the marginal edge of said glazing panel, a sealing member disposed in said channel about the marginal edge of said glazing panel, said retainer means including a second element urging said first element in interlocked relation with said enlarged formation of said first protrusion.

4,231,205

STEEL EDGE GYPSUM WALL PANEL

Alan C. Wendt, Barrington, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Filed Dec. 18, 1978, Ser. No. 970,073
Int. Cl.³ E04B *2/08*
U.S. Cl. 52—481 **27 Claims**



1. A steel edged gypsum wall panel engageable by flanged studs, said panel having substantially flush planar front and back surfaces and comprising:

a body portion of from about 5/16 inches to about ¾ inches thick having; front and back faces, and opposite marginal side edges, said front and back faces both having reduced portions adjacent said marginal side edges;

steel edges having a channel shape and comprising;

a front flange, a back flange,

a web portion integrally connecting said flanges and adapted to contact said marginal edge,

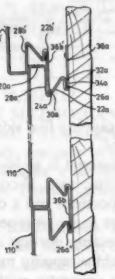
wherein said back flange terminates in a return flange providing an engageable slot therebetween and, wherein at each steel edge said front flanges and return flanges are spaced apart a distance no greater than the distance between said front flush planar surface and said back flush planar surface wherein said back flanges contact said reduced portions adjacent said marginal side edges.

4,231,206

SIDING STRUCTURE

Joseph A. Hafner, 91 Dover Dr., StoneyCreek, Canada

Continuation-in-part of Ser. No. 804,192, Jun. 6, 1977, abandoned. This application Dec. 12, 1978, Ser. No. 968,717
Int. Cl.² E04D *1/00*
U.S. Cl. 52—529 **7 Claims**



1. A construction panel of relatively thin material for use with other such panels to selectively apply lapped and flush siding on a building structure, the panel being elongated with a substantially constant transverse cross-section and comprising:

a main portion having a front surface which is apparent after assembly on the building structure;

a first marginal portion extending generally rearwardly from a longitudinal side extremity of the main portion and defining a first land extending generally rearwardly from said side extremity, a channel immediately adjacent a rearward extremity of the land and proportioned such that the land of an adjacent panel can be contained in the channel to locate the adjacent panel, and a tongue lying rearwardly of and immediately adjacent the channel, the tongue being generally parallel to the main portion and projecting outwardly for use in attaching the panel to the building structure;

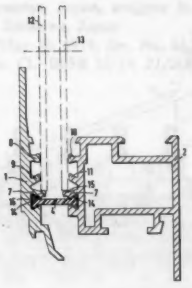
a second marginal portion also extending rearwardly and being connected to the main portion at a further longitudinal side extremity of the main portion such that the first and second marginal portions are generally parallel to one another, the second marginal portion being a mirror image of the first marginal portion and defining a second land, a second channel, and a second tongue, the respective channels also being adapted to receive tongues of other such panels to permit selective assembly either in the flush or lap arrangement, whereby in the lap arrangement one of the first and second channels receives a tongue of an adjacent panel with the land adjacent the channel positioned in the associated channel of the adjacent panel so that the thickness of the assembly is essentially twice the width of the land.

4,231,207

HEAT-INSULATED STRUCTURAL SECTION ASSEMBLY

Horstmar Kern, and Helmut Botzenhardt, both of Ulm, Fed. Rep. of Germany, assignors to Wieland-Werke Aktiengesellschaft, Ulm, Fed. Rep. of Germany

Filed Dec. 7, 1978, Ser. No. 967,533
Claims priority, application Fed. Rep. of Germany, Dec. 14, 1977, 2755697
Int. Cl.³ E04C *3/30*
U.S. Cl. 52—730 **1 Claim**



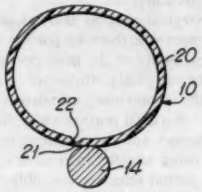
1. In a structural section assembly for use in manufacturing window and door frames consisting of two structural metal sections made from a metal selected from the group consisting of aluminum or aluminum alloy and having integral flanges defining opposed longitudinally extending grooves together with the webs of the respective structural metal sections, and connected to each other by a pair of plastic heat-insulating bars, said structural metal sections defining an enclosed air space together with said heat-insulating bars and said flanges being adapted to clamp the ends of said heat-insulating bars within said opposed grooves, wherein the improvement comprises the feature that the opposed flanges clamping one of the heat-insulating bars are made longer than the flanges for clamping the other heat-insulating bar, the arrangement being such that longer flanges during assembly are first bent by pressure rollers against the heat-insulating bar.

4,231,208

GUY GUARD AND METHOD OF INSTALLING SAME

J. Hebden Willox, 917 Newcastle Ave., Westchester, Ill. 60153

Filed Apr. 16, 1976, Ser. No. 677,566
Int. Cl.[2] E04H *12/20*
U.S. Cl. 52—741 2 Claims



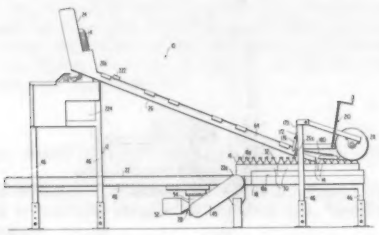
1. A method of assembling a guy guard over a guy assembly of a utility pole or the like, comprising the steps of extruding a generally cylindrical length of an elongated plastic guard member with an elongated frangible web, differentially stressing said guard member to bias said guard member to a tendency to wrap upon itself, and progressively fracturing said frangible web simultaneously forcing the guy wire through said frangible web when installing, whereupon the longitudinal edges of said frangible web will wrap and overlap themselves to securely fasten said guard member around said guy assembly.

4,231,209

SELF-SYNCHRONIZING BOTTLE CARRIER APPLICATOR

Maurice Walker; Buren R. Wheeley, both of Memphis, Tenn., and Charles A. Glass, Horn Lake, Miss., assignors to Royal Crown Cola Company, Atlanta, Ga.

Filed Jul. 10, 1979, Ser. No. 56,383
Int. Cl.[3] B65B *21/02*
U.S. Cl. 53—48 10 Claims



1. In a machine for forcibly applying a series of molded plastic carriers having at least one row of aligned holes therein to a series of upright container bottles moving along a horizontal bottle path, said machine including:

a hopper for supporting at least one stack of carriers above said bottle path,

means for removing in serial fashion carriers from the bottom of said stack and feeding them along a corresponding carrier path leading from said stack of carriers and which intersects the underlying bottle movement path such that movement of said bottles causes the tops of the bottles to pull the carriers over and across the tops of the bottles passing thereunder, and

an applicator wheel mounted for rotation about a horizontal axis, downstream of the intersection of the carrier path and the bottle path, and being positioned above said bottles and said carriers and means for forcibly applying said wheel into peripheral contact with said carriers to press said carriers onto the bottles to the extent that the bottle tops project through said holes,

the improvement wherein:

said means for feeding said carriers along a carrier path comprises a gravity chute longitudinally aligned with said bottle path and being inclined downwardly and away from said at least on carrier stack and terminating in an open discharge end just above the tops of said bottles, and wherein said bottle path is formed by a horizontal powered conveyor means beneath said chute with its discharge end terminating upstream of the discharge end of said gravity chute and a table having a top aligned with said horizontal powered conveyor means and extending downstream therefrom from the discharge end of said horizontal powered conveyor means to a point underlying said applicator wheel, and

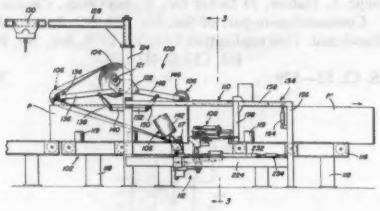
individual open top cartons of predetermined size carrying a predetermined number of said upright bottles in row and column positions therewithin corresponding to the position and spacing of said holes within said carriers such that regardless of random movement of said cartons of bottles along said horizontal bottle path by said horizontal power conveyor means, said cartons are moved over said table beneath the discharge end of said chute and to said applicator wheel in end-to-end contact solely by the force of cartons discharging onto said table top from said powered conveyor means such that carriers are always in proper alignment with said upright bottles whereby multi-bottle carrier packs are readily assembled with carrier portions encircling the bottle necks and with the carriers embracing a selected group of container bottles.

4,231,210

PACKAGE WRAPPING MACHINE

Gerald E. Nagode, 17920 S.W. Frances, Aloha, Oreg. 97005

Filed Apr. 24, 1979, Ser. No. 32,939
Int. Cl.[3] B65B *11/08, 27/10*
U.S. Cl. 53—397 24 Claims



15. A method for wrapping five sides of a six sided package, comprising the steps of:

holding wrapping material in an inverted U configuration in a holding apparatus, said U-configuration having two parallel material portions and a connecting portion;

conveying a package to be wrapped to a first work station beneath the connecting portion and between the parallel portions of the held wrapping material;

moving the holding apparatus with the wrapping material over the package leading end to thereby fold the material over the leading end;

stapling the folded wrapping material to the package leading end;

conveying the package forward, drawing the wrapping material with it until the package trailing end is positioned forward of the initial position of the package leading end;

cutting the wrapping material;

moving the holding apparatus with the wrapping material over the package trailing end to thereby fold the material over the trailing end; and

stapling the package trailing end to secure the wrapping material to the package.

4,231,211

METHOD AND APPARATUS FOR SEALING THE FILL OPENINGS OF HARD GELATINE CAPSULES FILLED WITH LIQUID

Armin Strampfer, Waiblingen, and Guenther Voegele, Schönaich, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Oct. 10, 1978, Ser. No. 949,930

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1977, 2747696

Int. Cl.³ B65B *3/02, 3/14*

U.S. Cl. 53—452 **3 Claims**

1. A method for filling and sealing hard gelatine capsules or the like having a dome-shaped end wall comprising the steps of, forming a spherical depression in said capsule end wall, inserting a hollow needle through said capsule end wall centrally of said spherical depression to form a fill opening, introducing a medicant into the interior of said capsule through said hollow needle, and filling said spherical depression with a sealing mass to seal said fill opening and conform said end wall containing said spherical depression to substantially its original shape.

4,231,212

VALVE BAG FEEDING METHOD AND MACHINE FOR POWDER MATERIAL PACKAGING APPARATUS

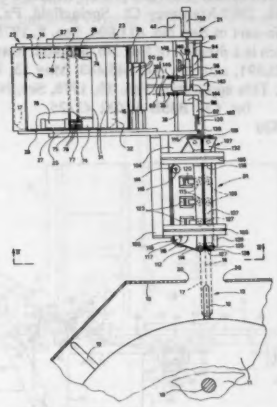
Angelo Raiteri, Turin, Italy, assignor to UNICEM-Unione Cementerie Marchino, Emiliane e di Augusta S.p.A., Casale Monferrato and Andrea Doria, Turin, both of, Italy, part interest to each

Continuation of Ser. No. 833,526, Sep. 15, 1977, abandoned. This application Jan. 26, 1979, Ser. No. 6,705

Int. Cl.³ B65B *43/26*

U.S. Cl. 53—459 **16 Claims**

14. Method for placing on a spout of a powder material packaging apparatus, a bag having at one edge of fold flange forming two wings and a valve which can be opened by pushing the two wings one toward the other, characterized by the step of picking up the bags one at a time from a magazine, the step of bringing the picked up bag to the entrance of a stationary shaping tube having a substantially horizontal axis aligned with said spout, the step of causing the valve flange of said bag to cross said tube, said tube having a section continuously variable through its length as to push the two wings of the flange one towards the other to cause said valve to be opened, and by the step of hurling said bag when crossing said tube at



such a speed as to assure that said valve be placed on the spout substantially when said valve flange has left said tube.

4,231,213

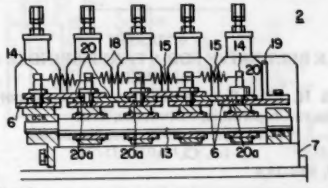
BOX PACKING MACHINE

Gosei Okazaki, Komatsu, Japan, assignor to Shibuya Kogyo Kabushikigaisha, Ishikawa, Japan

Filed May 30, 1979, Ser. No. 43,720

Int. Cl.³ B65B *57/14, 21/20*

U.S. Cl. 53—497 **12 Claims**



1. A box packing machine for placing containers of a given number into a box comprising a machine housing, a container space regulating unit which is movable reciprocatingly between the first and second positions defined in said machine housing, container supply means for supplying containers of a given number to said container space regulating unit while being located at the first position, arranging means provided on said container space regulating unit for arranging the containers to a desired format while said container space regulating unit advances from the first position to the second position, and a holder head, disposed vertically movably at the second position, which includes a plurality of holders for individually holding the upper portions of said containers in a desired format.

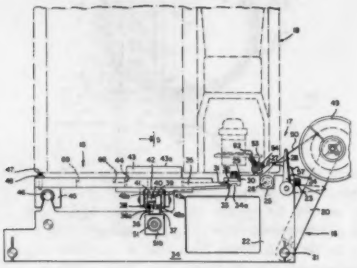
4,231,214
DEVICE FOR INSERTING A MICROFILM INTO MICROFILM JACKETS IN SERIES

Paul A. Kiejzik, 2907 Monterey Ct., Springfield, Pa. 19064

Continuation-in-part of Ser. No. 611,004, Sep. 8, 1975, Pat. No. 4,003,187, which is a division of Ser. No. 845,482, May 13, 1976, Pat. No. 4,123,891, and Ser. No. 845,483, May 13, 1976, Pat. No. 4,173,837. This application Feb. 15, 1978, Ser. No. 878,007

Int. Cl.³ B65B *63/00, 43/26*

U.S. Cl. 53—520 **3 Claims**



1. A device for inserting microfilm strip into microfilm jackets, comprising in combination: jacket supports means including separate first and second platform structures mounted in series with one-another, each platform structure being adapted to fixedly support microfilm jackets in predetermined support positions having jacket-channels of a first microfilm jacket when mounted on the first platform structure, substantially in parallel alignment with jacket-channels of a second microfilm jacket when mounted on the second platform structure, and the platform structure being further adapted for an insert-opening portion of the first microfilm jacket to receive a microfilm strip when one of said first and second platform structures is positioned at a first of said predetermined support-positions at substantially a predetermined edge of the first platform structure; and said first and second platform structures and said predetermined support positions being adapted such that a microfilm jacket opposite-end outlet-portion of the first microfilm jacket is in insert-communication with an insert opening portion of the second microfilm jacket.

4,231,215
SINGLE BELT DRIVE FOR A THREE-SPINDLE ROTARY MOWER

Kenneth H. Klas, Port Washington, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Apr. 19, 1979, Ser. No. 31,400

Int. Cl.³ A01D *35/26*

U.S. Cl. 56—11.6 **10 Claims**

1. In a power transmission for a mower movable in a predetermined forward direction of mowing operation having a downwardly open housing with a generally horizontal deck, the combination comprising:

three vertical spindles rotatably supported on said deck in a triangular pattern with upper ends disposed above said deck and lower ends disposed below said deck, one of said spindles being disposed forward of the other two spindles and said other two spindles being disposed on laterally opposite sides of said one spindle,

a cutting blade secured to said lower end of each of said spindles for rotation therewith,

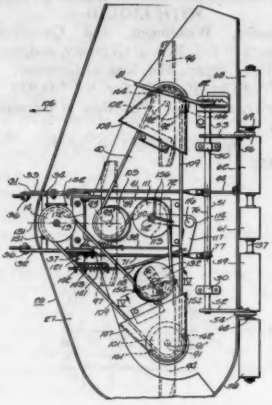
a driven pulley secured to said upper end of each of said spindles for rotation therewith,

a drive pulley disposed on a vertical axis spaced forwardly of said triangular pattern and said one spindle,

grooves in each of said driven and drive pulleys adapted to receive a V-belt,

a clutch idler lever pivotally mounted on said housing for rotation about a generally upright axis between a drive establishing position in which said belt is tightened and a nondriving position in which said belt is relaxed, said lever having a radially extending arm,

a clutch idler pulley rotatably supported on said arm for movement about an axis spaced from said upright axis and from the axes of rotation of said spindles said clutch idler pulley being disposed rearwardly of said one spindle,



a single continuous V-belt trained around said pulleys and having but a single arc of contact with each pulley, respectively, said V-belt having tapered driving surfaces in contact with said grooves of said drive and driven pulleys and a flat backside in contact with said clutch idler pulley, said belt being free of severe twists and crossovers in its installed condition on said pulleys and sequentially engaging said pulley on said one spindle and said clutch idler pulley.

4,231,216
MOWER WITH BOTTOM-DRIVEN CUTTER DISCS

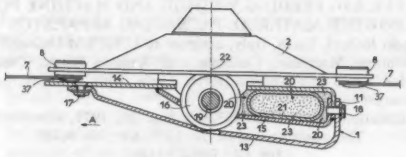
Marcel Weber, Marmoutier, France, assignor to Societe Samibem, S.A., Marmoutier, France

Filed Jun. 6, 1978, Ser. No. 913,074

Claims priority, application France, Jun. 15, 1977, 77-18776

Int. Cl.³ A01D *55/26, 35/264*

U.S. Cl. 56—13.6 **3 Claims**



1. A mower comprising a plurality of bottom driven discs, cutters on said discs, screws securing said cutters on said discs, an elongated housing disposed beneath said discs, transmission means in said housing for driving said discs in rotation, and a hollow beam for increasing the rigidity of said housing, said beam being disposed in the housing at least at one end of said housing, at least one of said beam and housing being filled with hardened expanded synthetic resin thereby to reduce drum resonance effect, means at said one end of said housing for connecting said mower to a drive vehicle, said beam being

disposed between the axes of rotation of the discs and the axes of said screws when said screws are disposed farthest to the rear in their paths of rotation.

4,231,217

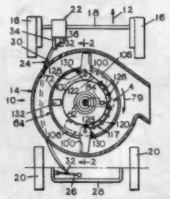
LAWN MOWER SAFETY DEVICE

Frank J. Lucas, 302 N. Center St., Box 316, LaGrange, Ohio 44050

Continuation-in-part of Ser. No. 45,348, Jun. 4, 1979, abandoned. This application Jul. 27, 1979, Ser. No. 61,360

Int. Cl.³ A01D *75/20*

U.S. Cl. 56—17.4 **7 Claims**



1. In a lawn mower having wheels and an engine for propelling it, the combination comprising,

a clutch/transmission unit for selectively interconnecting the engine and the wheels,

manually actuated means for controlling said unit,

a rotor rotatable on a vertical axis and driven by the engine,

cutting blades on the rotor and movable between an active position extending radially beyond the rotor and an inactive position within the perimeter of the rotor, and

means operably controlled by the manually actuated means for moving the cutting blades to active position.

4,231,218

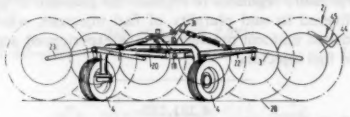
RAKE WITH PIVOTABLE ARMS

Luis D. Delgado, Palencia, Spain, assignor to Vicon España S.A., Palencia, Spain

Continuation of Ser. No. 546,866, Feb. 4, 1975, abandoned. This application Oct. 20, 1976, Ser. No. 734,193

Int. Cl.³ A01D *78/04*

U.S. Cl. 56—377 **24 Claims**



1. A rake comprising at least one main frame provided with wheels, a subframe pivotally connected with said main frame for up and down swinging movement relative thereto, two board supports pivotally connected with said subframe for seesaw movement relative thereto and a plurality of rake boards rotatably arranged on the board supports, characterized in that the subframe is formed mainly by relatively independently pivotable arms secured to the main frame.

4,231,219

METHOD AND APPARATUS FOR ALLEVIATING TIGHT SPOTS IN FALSE TWIST TEXTURED YARN

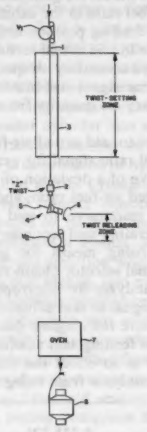
Ernest J. Griset, Jr., Asheville, N.C., assignor to Akzona Incorporated, Asheville, N.C.

Filed Jun. 4, 1979, Ser. No. 44,995

Int. Cl.³ D02G *1/20, 1/04*

U.S. Cl. 57—290 **11 Claims**

1. A method for alleviating tight spots in false twist textured yarn which comprises, feeding a thermoplastic multi-filament yarn to a false twister, imparting a false twist to the yarn in one direction, setting the twist to provide a torque in the yarn, and then passing the yarn around a tapered flange of a freely rotatable roller to impart a twist in the yarn of a direction opposite



to that of the false twist imparted by the twister and of a magnitude sufficient to alleviate tight spots occurring in the yarn during passage through said false twister without substantially reducing said torque.

4,231,220

SECONDARY AIR CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

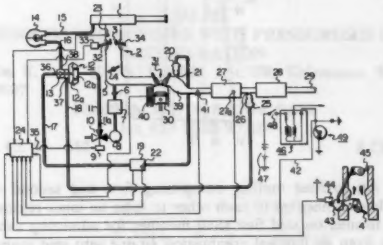
Keiso Takeda, Susono, Japan, assignor to Toyota Kidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Aug. 9, 1978, Ser. No. 932,189

Claims priority, application Japan, Aug. 17, 1977, 52-97877

Int. Cl.³ F01N *3/15, 3/10;* **F02B** *75/10*

U.S. Cl. 60—276 **6 Claims**



1. A secondary air control system in an exhaust gas purifying system for an internal combustion engine including a three-way catalyzer in an exhaust passage of the engine and a secondary air feed device for feeding secondary air via a secondary air passage into said exhaust passage upstream of said catalyzer, said secondary air control system comprising:

a control valve in said secondary air passage for regulating the flow rate of the secondary air fed therethrough;

means for generating a signal indicative of a desired quantity of the secondary air determined by the quantity of an intake air supplied into the engine via a carburetor, the basic air-fuel ratio set by said carburetor and the desired air-fuel ratio for said catalyzer;

first feedback means for generating a signal indicative of an

actual quantity of the secondary air fed via said secondary air valve;

means for generating a signal indicative of the desired air-fuel ratio;

second feed back means for generating a signal indicative of an actual air-fuel ratio in the exhaust passage between the secondary air feeding position and said catalyzer;

means responsive to said actual secondary air quantity signal and said desired secondary air quantity signal for generating a first error signal indicative of a deviation of the actual secondary air quantity from the desired secondary air quantity;

means responsive to said actual air-fuel ratio signal and said desired air-fuel ratio signal for generating a second error signal indicative of a deviation of the actual air-fuel ratio from the desired air-fuel ratio; and

actuator means responsive to said first and second error signals for operating said secondary air valve, said system further comprising means for generating an auxiliary signal, and signal selector means responsive to a temperature of said catalyzer for interrupting the feeding of said second error signal to said actuator means when the catalyzer temperature rises higher than a predetermined temperature, while feeding said auxiliary signal to said actuator means, so as to effect the secondary air control to prevent said catalyzer from being overheated.

4,231,221

EXHAUST SILENCER FOR EXHAUST SYSTEMS OF INTERNAL COMBUSTION ENGINES, PARTICULARLY INTERNAL COMBUSTION ENGINE-OPERATED MANUAL APPLIANCES

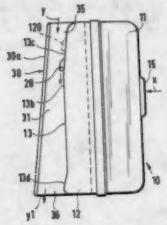
Manfred Mäthner, Hamburg, and Peter Thomsen, Quickborn, both of Fed. Rep. of Germany, assignors to Dolmar Maschinenfabrik GmbH & Co., Hamburg, Fed. Rep. of Germany

Filed Jun. 21, 1978, Ser. No. 917,672

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1978, 7810865[U]

Int. Cl.[3] F01N 5/04, 1/14

U.S. Cl. 60—319 **8 Claims**



1. An exhaust muffler comprising first and second shell members connected to each other to form an inner region, an inlet formed on said first shell member for admitting exhaust gases from an internal combustion engine into said inner region, a number of discharge ports formed on a wall part of said second shell member which faces said inlet, a cover shell extending over the outside of said wall part of said second shell member for forming therewith an elongated cooling channel having an air inlet opening at one end and a diffusing outlet opening at the other end in the axial direction of said cooling channel, a discharge hood associated with each of said discharge ports for deflecting exhaust gases flowing out of said discharge ports from said inner region into said cooling channel in the direction of said diffusing outlet opening, said cover shell and said wall part together defining a Venturi tube in the longitudinal cross-section of said channel, said discharge hoods being arranged successively in the longitudinal direction of said cooling channel wherein said wall part deflects in the direction opposite from said cover shell by an angle (α) of about 2° to 8° after the last successive one of said discharge hoods in the direction of said diffusing outlet opening of said channel for maintaining gas flow in said cooling channel contiguous to said wall part.

4,231,222

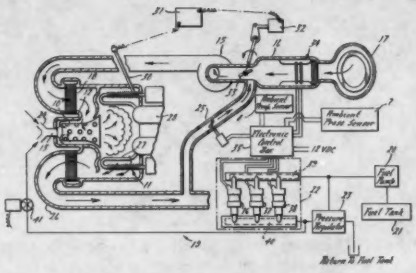
AIR FUEL CONTROL SYSTEM FOR STIRLING ENGINE

James E. Fenton, Ann Arbor, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sep. 18, 1978, Ser. No. 943,593

Int. Cl.[3] F02G 1/04

U.S. Cl. 60—524 **10 Claims**



1. In an apparatus for maintaining the temperature of a heater head of a hot gas engine at a substantially constant temperature, the engine having a combustion chamber and the apparatus having a temperature responsive element giving a signal in accordance with the temperature of the heater head, said apparatus further having a servo-system governed by said signal and a regulating means including a combustion air blower driven by the engine governing the rate of delivery of combustion air from the blower operable by said servo-system, the improvement comprising:

(a) means responsive to the rate of flow of combustion air from the blower including a plurality of differentially sized fuel injectors effective to continuously introduce fuel through one or more of said injectors to the air delivered by said blower for combustion, said injectors being effective to meter fuel over a range of 0.4–15 grams per second; and

(b) a pressure regulator to regulate the pressure of said fuel delivered to said plurality of fuel injectors, whereby a constant uniform pressure drop is experienced across all said fuel injectors.

4,231,223

THERMAL ENERGY SCAVENGER (ROTATING WIRE MODULES)

William L. Pringle, 999 Lake Shore Rd., Grosse Pointe Shores, Mich. 48236; Peter A. Hochstein, 14020 Fifteen Mile Rd., Sterling Heights, Mich. 48077, and Harold W. Milton, Jr., 3318 Tothill Rd., Troy, Mich. 48084

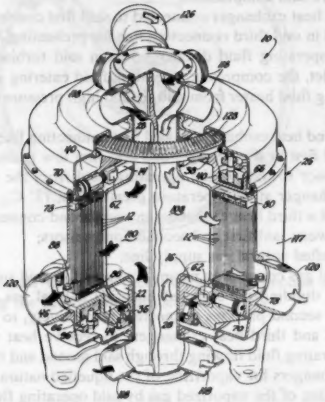
Filed Jun. 9, 1978, Ser. No. 914,030

Int. Cl.[3] F03G 7/06

U.S. Cl. 60—527 **17 Claims**

1. A thermal energy scavenger assembly comprising: a plurality of temperature-sensitive elements made of material which exhibits shape memory due to thermoelastic, martensitic phase transformation; said elements being elongated with first and second ends; reaction means reacting with said elements for applying a stress to said elements to strain said elements during a first phase and for responding to the unstraining of said elements during a second phase; carriage means supporting said first and second ends of said elements for allowing said elements to be placed in tension while reacting with said reaction means; said carriage means including a plurality of independent modules; each of said modules supporting a group of

said elements so that each group of said elements react collectively with said reaction means and independently of the groups of other modules; said elements in each of said groups being parallel to one another; said reaction means comprising cam means disposed about a central axis with at least one cam surface disposed about the periphery of said cam means; support means supporting said cam means and said carriage means



for allowing relative movement between said cam means and said carriage means to extract energy as said elements unstrain and shorten in length during said second phase; each of said modules including a cam follower for engaging said cam means, and hydraulic means disposed between each of said cam followers and said group of elements of each module for transferring reaction forces between said cam means and said elements of each group.

4,231,224

MASTER CYLINDER ASSEMBLIES FOR VEHICLE HYDRAULIC BRAKING SYSTEMS

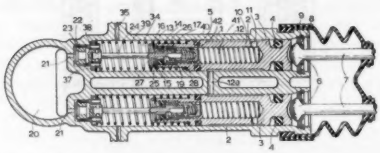
Roy E. Edwards, Warley; Anthony G. Price, Birmingham, and John R. Rees, Halesowen, all of England, assignors to Girling Limited, Birmingham, England

Filed Oct. 12, 1977, Ser. No. 841,287

Claims priority, application United Kingdom, Oct. 12, 1976, 42254/76

Int. Cl.³ F15B *7/00*

U.S. Cl. 60—581 **2 Claims**



1. An hydraulic master cylinder assembly for a vehicle braking system comprising two separate first and second master cylinders, each said master cylinder comprising a piston adapted to work in a bore, a pressure space in said bore in front of said piston, means defining a transfer chamber, a recuperation port for connection to a reservoir for fluid and a transfer valve which is movable between a fully open position by movement of said piston in a direction to pressurize hydraulic fluid in said pressure space and a closed position to isolate said transfer chamber of that master cylinder from said recuperation port therefor, and said transfer chambers are connected by a transfer passage, wherein said transfer valves are normally open and said transfer valve of each master cylinder incorporates pressure-responsive means responsive to pressure in said transfer chamber of a corresponding one of said master cylinders, said pressure-responsive means in said first master cylinder being operative to urge said transfer valve of said first master cylinder into said closed position when pressure in said transfer chamber of said first master cylinder is increased by pressurization of hydraulic fluid in said pressure space of said second master cylinder by transfer of hydraulic fluid through said transfer chamber when said second master cylinder is operated on its own, and said pressure-responsive means in said second master cylinder being operative to urge said transfer valve of said second master cylinder into said closed position when pressure in said transfer chamber of said second master cylinder is increased by pressurization of hydraulic fluid in said pressure space of said first master cylinder by transfer of hydraulic fluid through said transfer chamber when said first master cylinder is operated on its own, and wherein each of said transfer valves comprises a seating, a member which is movable in a brake-applying direction when that master cylinder is operated carrying said seating, said member including an axial extension, a valve member responsive to pressure in said transfer chamber and extending into said extension, a first spring for biassing said valve member normally away from said seating, and means defining a restricted flow path between said transfer chamber and said recuperation port when said valve member is biassed away from said seating, and wherein said member carrying said seating comprises the forward end of said pedal-operated piston of said master cylinder, and an axially extending rod is coupled for relative axial movement through a limited distance at one end to said valve member, said valve member surrounding said rod and the other opposite end of said rod remote from said piston carrying a head for engagement with a seating surrounding said recuperation port, said rod carrying a stop and said first spring acting between said valve member and said rod normally to urge said valve member into engagement with said stop, said stop defining a distance by which said valve member can be moved away from said seating, and said seating being movable relatively away from said valve member in response to movement of said piston in a brake applying direction to pressurize fluid in said pressure space and after said head has engaged with said seating surrounding said recuperaton port to isolate said reservoir from said pressure space.

4,231,225

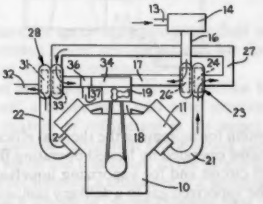
TURBOCHARGED ENGINE WITH PRESSURIZED GAS RECIRCULATION

Kazim K. Aya, 105 N. Kendall, Apt. 3R, Kalamazoo, Mich. 49007

Filed Feb. 5, 1979, Ser. No. 9,646

Int. Cl.³ F02B *37/00*

U.S. Cl. 60—612 **6 Claims**



1. In an internal combustion engine having a plurality of piston-containing cylinders each defining a combustion chamber, intake manifold means communicating with said combustion chambers, an intake conduit communicating with said intake manifold means for supplying air thereto, an exhaust manifold communicating with said combustion chambers for receiving therefrom the hot exhaust gases, and first turbocharger means for pressurizing the air supplied to said intake

manifold means, said first turbocharger means including a rotatable turbine section drivingly connected to and rotatably driving a compressor section, said compressor section being associated with said intake conduit for pressurizing the air which is supplied to said intake manifold means, and a first exhaust conduit providing communication between said exhaust manifold means and said turbine section for rotatably driving said turbine section by the hot exhaust gases which flow through said first exhaust conduit, the improvement comprising second turbocharger means for pressurizing and supplying at least a part of the hot exhaust gases to said intake manifold means, said second turbocharger means including a rotatable turbine part drivingly connected to a rotatable compressor part, a second exhaust conduit communicating between said exhaust manifold means and said turbine part for supplying at least a part of the hot exhaust gases to said turbine part for rotatably driving same, intermediate passage means connected between the discharge of said turbine section and the inlet of said compressor part for supplying the exhaust gases from said first turbocharger means to the compressor part of said second turbocharger means for effecting pressurization of said exhaust gases, and an inlet conduit connected between said compressor part and said intake manifold means for supplying said pressurized exhaust gases from said compressor part to said intake manifold means for mixing with the pressurized air supplied through said intake conduit, the pressurized mixture of exhaust gases and air within said intake manifold means being supplied to said combustion chambers.

4,231,226

METHOD AND APPARATUS FOR VAPORIZING LIQUID NATURAL GASES

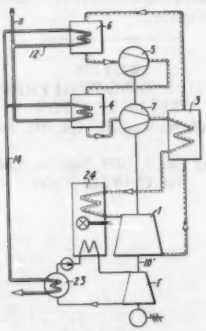
Hartmut Griepentrog, Oberhausen, Fed. Rep. of Germany, assignor to Maschinenfabrik Augsburg-Nürnberg Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 684,646, May 10, 1976, abandoned. This application Apr. 10, 1978, Ser. No. 895,043

Claims priority, application Fed. Rep. of Germany, May 28, 1975, 2523672

Int. Cl.³ F01K *17/00*

U.S. Cl. 60—648 **2 Claims**



1. A system for increasing the thermal efficiency of a closed-circuit engine operated by heated operating fluid circulating in the closed circuit and for vaporizing liquefied natural gas and heating the vaporized gas to a delivery temperature suitable for delivery of the gas to a gas pipeline network, said device comprising, in combination:

said closed circuit comprising a turbine having a heated operating fluid supply inlet and an operating fluid exhaust outlet; a low pressure compressor in said closed circuit; a high pressure compressor in said closed circuit; an operating fluid heater having a heated operating fluid discharge connected to said fluid supply inlet of said turbine to drive said turbine, a first connecting line connecting said turbine exhaust outlet to the inlet of said first low pressure compressor, a second connecting line connecting the outlet of said first low pressure compressor to the inlet of said second high pressure compressor, and a third connecting line connecting the outlet of said second high pressure compressor to the inlet of said operating fluid heater;

driving means connecting said turbine to said compressors to drive said compressors;

a first heat exchanger connected to said first connecting line and in said third connecting line for preheating, by means of operating fluid discharged from said turbine exhaust outlet, the compressed operating fluid entering said operating fluid heater from said second high pressure compressor;

a second heat exchanger in said first connecting line between said first heat exchanger and said first low pressure compressor to receive the operating fluid from the first heat exchanger at a temperature greater than 15° C.;

at least a third heat exchanger in said second connecting line between said first and second compressors;

a liquefied natural gas supply line;

natural gas connection means connected to said supply line and dividing the supplied liquefied natural gas into first and second portions connected, respectively, to said second and third heat exchangers to receive heat from the operating fluid flowing through said second and third heat exchangers for vaporizing of the liquefied natural gas and heating of the vaporized gas by said operating fluid flowing through said first and second connecting lines of said closed circuit with resultant substantial cooling, by said liquefied natural gas, of said operating fluid entering said first and second compressors;

a natural gas discharge line connected to both of said second and third heat exchangers to receive at least partially vaporized natural gas therefrom; and

after-heater means operatively associated with said natural gas discharge line for further heating the natural gas flowing through said natural gas discharge line to such delivery temperature, said after-heater means comprising, a fourth heat exchanger, a second turbine, and a second closed circuit carrying a fluid operating medium for said second turbine, said second closed circuit comprising said second turbine, said fourth heat exchanger, and heat exchange means associated with said operating fluid heater to receive heat from said heater, said fourth heat exchanger comprising a heat transfer line connected in series with said natural gas discharge line to transfer heat from said operating fluid medium to said natural gas.

4,231,227

PRILL TOWER RAKE

Robert M. Stewart, and Robert W. Schwartz, both of Memphis, Tenn., assignors to W. R. Grace & Co., New York, N.Y.

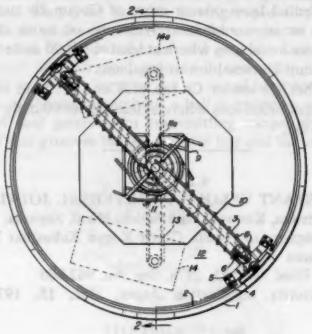
Division of Ser. No. 832,933, Sep. 13, 1977, Pat. No. 4,160,631. This application Mar. 26, 1979, Ser. No. 23,911

Int. Cl.³ F25D *17/00*

U.S. Cl. 62—57 **1 Claim**

1. The process of cooling and collecting urea prills that have fallen through a circular prilling tower without subsequently passing them through a separate cooler which comprises collecting said prills on a flat, substantially circular fluidized bed of prills about one inch thick fluidized by ambient air at about

0° to 120° F. whereby the prills are cooled to about 100° to 140° F.; rotating a multi-bladed rake through the bed to further mix



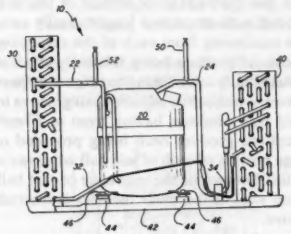
the prills and to sweep them toward a collection exit; and collecting the thus cooled prills.

4,231,228

COMBINATION PROCESS TUBE AND VIBRATION ATTENUATOR FOR A REFRIGERATION CIRCUIT

Michael E. Galvin, Clay, and Robert J. Whitwell, Liverpool, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Aug. 3, 1979, Ser. No. 63,623
Int. Cl.³ F25B *45/00*
U.S. Cl. 62—77 **7 Claims**



1. A vapor compression refrigeration circuit having components including an evaporator, a condenser, a compressor and an expansion device which comprises:

a refrigerant line connecting at least two of said components, said line having a process opening therein; and

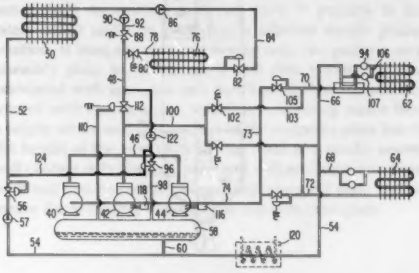
means acting as a combination process tube and refrigerant pressure variation attenuator, said means being attached to the refrigerant line to be in communication with the refrigerant flowing therethrough via the process opening, said means being configured to attenuate pressure variations within the refrigerant flowing through the refrigeration circuit and said means further serving to provide apparatus for charging the refrigeration circuit with refrigerant.

4,231,229

ENERGY CONSERVATION SYSTEM HAVING IMPROVED MEANS FOR CONTROLLING RECEIVER PRESSURE

Benjamin R. Willitts, Lawrenceville, N.J., assignor to Emhart Industries, Inc., Farmington, Conn.

Filed Mar. 21, 1979, Ser. No. 22,583
Int. Cl.³ F25B *41/00*
U.S. Cl. 62—196 A **8 Claims**



1. In a refrigeration system including a compressor, a condenser, a receiver, an evaporator, a discharge line extending from the compressor to the condenser, a liquid line extending from the condenser to the evaporator, a connecting line between the liquid line and the receiver, a return line extending from the evaporator to the compressor, an inlet pressure regulating valve in the liquid line adapted to establish and maintain pressures in the liquid and discharge lines at pre-selected, different operating levels, and a receiver pressure control line connected between the compressor discharge line and the receiver, the improvement comprising a differential pressure regulating valve that controls communication between the discharge line and the receiver through the receiver pressure control line, and that is sensitive to the pressure differential between the liquid and discharge lines to establish and maintain the receiver pressure at a valve which is a function of said pressure differential, said differential pressure regulating valve being mounted in the receiver pressure control line to control flow therethrough.

4,231,230

REFRIGERANT ACCUMULATOR AND METHOD OF MANUFACTURE THEREOF

Nelson R. Gratzer, Germantown, Tenn., and William E. Wright, East Syracuse, N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Apr. 11, 1979, Ser. No. 28,932
Int. Cl.³ F25B *43/00*
U.S. Cl. 62—503 **6 Claims**

1. An accumulator for receiving a two phase fluid mixture of refrigerant, for storing liquid refrigerant and for discharging gaseous refrigerant which comprises:

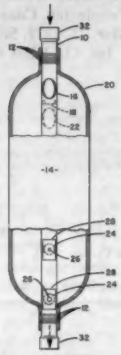
a tube mounted in a generally vertical direction having an upper end and a lower end, said tube receiving a two phase fluid mixture of refrigerant at the upper end and discharging gaseous refrigerant at the lower end;

a shell formed about and connected to the tube intermediate the ends thereof forming a container of a selected volume;

said tube having a discharge opening located near the top of the container to allow the refrigerant mixture entering the upper end of the tube to flow into the container;

said tube having an inlet opening communicating the container with the tube for discharging gaseous refrigerant from the lower end of the tube, said inlet openings being located below the discharge opening and spaced above the bottom of the container such that liquid refrigerant may collect in the lower portion of the container without being discharged from the container; and

diverting means mounted in the tube between the inlet opening and the discharge opening, said diverting means acting to prevent flow of refrigerant directly from the upper end of the tube to the lower end of the tube whereby refrigerant entering the upper end of the tube flows through the discharge opening into the container and may then flow from the container through the inlet opening to the lower end of the tube.



4,231,231

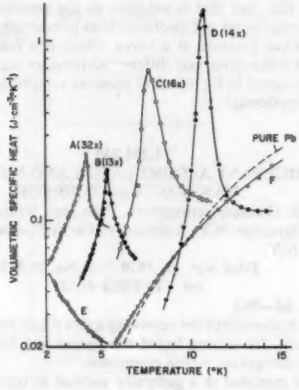
CRYOGENIC CERAMIC AND APPARATUS

William N. Lawless, Westerville, Ohio, assignor to Corning Glass Works, Corning, N.Y.

Filed Apr. 13, 1979, Ser. No. 29,554

Int. Cl.³ C04B *35/42;* **C09K** *5/00;* **F25B** *19/00;* **F28D** *17/00*

U.S. Cl. 62—514 R **22 Claims**



8. In cryogenic refrigeration apparatus comprising a load to be refrigerated,

a refrigerant adapted to refrigerate the load at temperatures below 15° K.,

thermal energy absorbing elements associated with the refrigerant and adapted to function at temperatures below 15° K.,

wherein the improvement comprises at least one of the thermal energy absorbing elements being composed of ceramic material:

(a) characterized by

(1) being a dielectric insulator and

(2) having values of specific heat at selected temperatures below 15° K. that are greater than or at least equal to the values of specific heat of pure Pb at those sampe temperatures, and p2 (b) consisting essentially of a crystalline phase with a composition defined by the molar formula AB_2O_4 where

A is selected from one or more of Group 2b metal ions alone or in combination with one or more of other divalent metal ions where at least about 90 mole % of A is Group 2b metal ion or ions, and

B is either Cr ion or Cr ion plus one or more of other trivalent metal ions where at least about 90 mole % of B is Cr ion.

4,231,232

CONSTANT VELOCITY UNIVERSAL JOINT

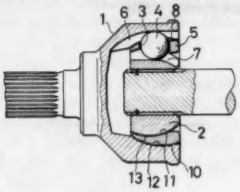
Nobuyuki Otsuka, Kawagoe, and Seiichi Hirai, Sayama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 21, 1978, Ser. No. 962,800

Claims priority, application Japan, Dec. 15, 1977, 52-167663[U]

Int. Cl.³ F16D *3/33*

U.S. Cl. 64—21 **6 Claims**



1. An improved constant velocity universal joint having an outer member and an inner member each mounted through a ball cage having a plurality of balls mounted in respective ball windows, said balls being in engagement with respective pairs of longitudinally extending ball grooves formed in mutually facing spherical surfaces of the respective inner and outer members, said ball cage having front and rear edges and being inserted front edge first into said outer member, the improvement wherein the ball cage has an outer spherical surface in contact with the spherical inner surface of the outer member and is provided with respective longitudinally extending cut-out grooves continuing from each of the respective ball windows, said cut-out grooves being relatively small in size with contours substantially conforming to respective partition walls disposed between respective adjacent ball grooves in said outer member, said ball windows having front and rear edge portions, said cut-out grooves each being provided only at one said rear edge portion of each of said ball windows and extending longitudinally towards the rear edge of said ball cage, and each partition wall of the outer member is insertable in each cut-out groove.

4,231,233

RIGID NON-SLIDING HOMOKINETIC UNIVERSAL JOINT

Werner Krude, Neunkirchen, Fed. Rep. of Germany, assignor to Uni-Cardan Aktiengesellschaft, Lohmar, Fed. Rep. of Germany

Filed Jan. 23, 1979, Ser. No. 5,706

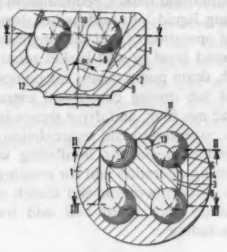
Claims priority, application Fed. Rep. of Germany, Jan. 31, 1978, 2804042

Int. Cl.³ F16D *3/30*

U.S. Cl. 64—21 **5 Claims**

1. Rigid (non-sliding) homokinetic universal joint comprising an outer hollow joint member having an axes of rotation and having a spherical inner surface defining the hollow interior, said outer joint member having a plurality of grooves

formed into said inner surface, an inner joint member having an axis of rotation angularly displaceable relative to the axis of rotation of said outer joint member and positioned within said outer hollow joint member and having a spherical outer surface, said inner joint member having a plurality of grooves formed into said outer surface and the number of said grooves corresponds to the number of said grooves formed into said outer joint member, said grooves in said outer joint member and said inner joint member are arranged in opposed pairs one in each of the joint members, a ball is seated in each opposed pairs of said grooves for transmitting torque therebetween, each of said grooves having a center line and the center lines of



each opposed pair of grooves cross one another and form an angle therebetween, the centers of said balls guided in said opposed pairs of grooves being guided in a plane bisecting the angle between the axis of rotation of said inner and outer joint members, the spherical outer surface of said inner joint member is guided in the spherical inner surface of said outer joint member, the axis of rotation of said inner joint member and outer joint member intersecting at the center of the joint, wherein the improvement comprises that the center line of each of said grooves in said inner and outer joint members extends along a circular arc and a plane containing the circular arc intersects the axes of rotation of the joint member containing the groove at a location spaced from the center of the joint.

4,231,234

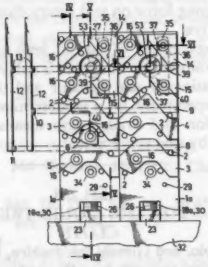
ASSEMBLY PLATE FOR ASSEMBLING CAM PARTS OF A KNITTING MACHINE

Manfred Schmid, Bempflingen; Martin Elsaber, Stuttgart, and Manfred Weik, Echterdingen, all of Fed. Rep. of Germany, assignors to Sulzer Morat GmbH, Bonlanden, Fed. Rep. of Germany

Continuation of Ser. No. 728,460, Sep. 29, 1976, abandoned. This application May 30, 1978, Ser. No. 910,337

Int. Cl.[2] D04B *9/06, 15/34*

U.S. Cl. 66—27 **10 Claims**



1. An assembly plate mounted on a cam base plate for the stationary and interchangeable assembling of at least one cam part of a group of cam parts of a knitting machine at at least one location on the assembly plate, said group including a plurality of cam parts of the same or different type, each cam part having an outer contour and one predetermined position at said location, and the assembly plate having a first surface and attaching means for mounting said cam parts on said assembly plate first surface and a plurality of first positioning means for association with said cam parts, said first positioning means being raised portions of the assembly plate which are integral and unitary with such plate, said first positioning means being located essentially entirely on said assembly plate first surface about the outer contour of each of said cam parts with respect to said attaching means for non-rotatably and non-slidably maintaining said cam parts in position to accurately orient said cam parts into a selected needle guidance position, at least one cam part having only one position on said assembly plate in which all of said first positioning means associated with such one cam part bear against the outer contour of such one cam part, said first positioning means having a height above said first surface of the assembly plate less than the height of the cam parts so that butts of a needle assembly will contact only the cam parts and will not come into contact with said first positioning means, said assembly plate including means for mounting said plate on the cam base plate.

4,231,235

DEVICE FOR ADVANCING THE MAIN DRUM IN A CIRCULAR KNITTING MACHINE

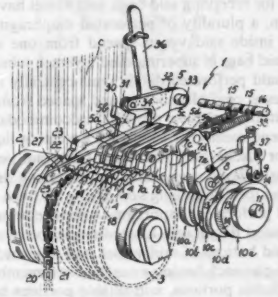
Francesco Lonati, Via Valsorda, 28, Brescia, Italy

Filed Apr. 9, 1979, Ser. No. 28,154

Claims priority, application Italy, Apr. 14, 1978, 22355 A/78

Int. Cl.[3] D04B *15/00*

U.S. Cl. 66—236 **4 Claims**



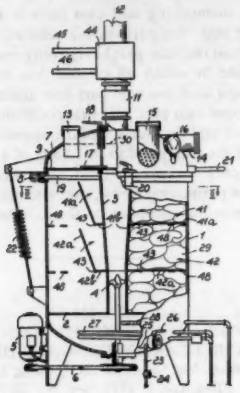
1. In a circular knitting machine having at least one needle cylinder, a main drum for controlling knitting steps and a sawtooth ratched wheel rigid with said drum, a device for controlling advancement of said drum, said device comprising a primary pawl and four secondary pawls, a number of rows of teeth on said ratched wheel corresponding to the number of said pawls, said teeth each having a tip and an axial width, means for moving back and forth said primary pawl and said secondary pawls such that said primary pawl performs one back and forth movement during two revolutions of said at least one needle cylinder and said secondary pawls each performs two back and forth movements in regular succession within the span of two revolutions of said at least one needle cylinder, means for inactivating said primary pawl according to a knitting program, programming members arranged between said rows of teeth, said programming members extending circumferentially over a distance related to said knitting program and radially at least as far as said tips of said teeth, each of said secondary pawls having a working end having a width greater than said axial width of said teeth.

4,231,236

DYEING MACHINE, PARTICULARLY FOR DYEING AND DRYING STOCKING ARTICLES AND LIKE GARMENTS

Bruno G. Tratta, and Ermanno Tagliaferri, both of Calvisano, Italy, assignors to Tidue S.r.l., Giovanni In Croce, Italy

Filed Apr. 7, 1978, Ser. No. 894,311
Claims priority, application Italy, Apr. 18, 1977, 22563A/77
Int. Cl.[2] D06B *5/24*
U.S. Cl. 68—15 **4 Claims**



1. A machine for dyeing and drying stocking articles and like garments contained in bags, comprising a substantially cylindrical vessel for receiving said bags, said vessel having a cover and a bottom, a plurality of perforated diaphragms arranged horizontally inside said vessel spaced from one another for supporting said bags in superimposed layers, a tubular element penetrating said perforated diaphragms centrally and extending in said vessel coaxially thereto and spaced from said cover and said bottom, a driven propeller accommodated in said tubular element, means for supplying a treating liquid to said vessel and for discharging said liquid from said vessel, means for heating said liquid, and means for supplying drying air to said vessel and for discharging said drying air from said vessel, wherein said perforated diaphragms comprise an upper and a lower perforated diaphragm located respectively next to said cover and said bottom of said vessel, and intermediate perforated diaphragms each having a central cross member and two perforated tiltable portions, said tiltable portions being oppositely located with respect to said cross member and pivotally supported thereby to be tilted in a position allowing loading and unloading of said bags.

4,231,237

WASHING MACHINE WITH DELAYED ACTION DRIVE CLUTCH

John Bochan, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Dec. 21, 1978, Ser. No. 972,117
Int. Cl.[3] D06F *23/04, 37/40*
U.S. Cl. 68—23.7 **22 Claims**

1. A delayed action drive mechanism comprising:

a first drive member;

a second drive member;

movable engagement means including at least one clutch member mounted to said second drive member and movable into engagement with said first drive member to establish a driving engagement therebetween;

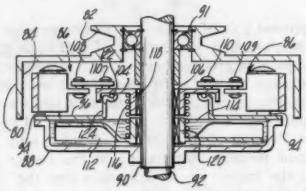
delay means retarding movement of said at least one clutch member into said engagement with said first drive member, said delay means including:

a rotary member;

means causing rotation of said rotary member by movement of said at least one clutch member towards engagement with said first drive member;

damping means driven by said rotary member and imposing a viscous damping force thereon resisting said movement, whereby said viscous damping force delays the movement of said at least one clutch member into engagement with said first drive member, whereby engagement is delayed.

12. In a clothes washing machine of the type including a tub and a perforate basket disposed within said tub, means for introducing a washing liquid into said tub and basket, an agitator mounted within said basket, recirculation pump means for pumping washing liquid into said basket during washing and rinsing cycles of operation of said washing machine to produce an increased liquid level in said basket relative to the liquid level in said tub, drain pump means for pumping liquid out of said basket and tub during centrifugal extraction cycles of operation of said machine, and drive means including a drive motor directly connected to said recirculation and drain pump means, transmission means for oscillating said agitator for washing and rinsing operation and for rotating said basket for centrifugal extraction operation and clutch means drivingly connected between said motor and said transmission; said clutch means including:



an input drive member connected for rotation by said motor;

at least one clutch member constructed and arranged to move outwardly in response to rotation of said input drive member;

an output drive member connected to said transmission and located for engagement by said at least one clutch member after a predetermined outward movement of said at least one clutch member so as to establish a driving connection therebetween;

a damping means; and

a rotary damper plate associated with said damping means and connected to said at least one clutch member; said at least one clutch member causing rotation of rotary damper plate relative to said damping means in response to outward movement of said at least one clutch member and said damping means being effective to impose a viscous damping force on said rotary damper plate opposing such relative;

whereby engagement of said at least one clutch member with said output drive member is delayed to thereby delay the oscillation of said agitator and the rotation of said basket, respectively, for a predetermined period after said recirculation and drain pump means, respectively, are activated by said drive motor.

4,231,238

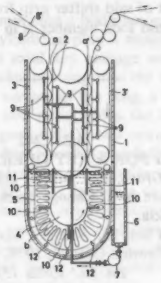
APPARATUS FOR THE LIQUID TREATMENT OF A CLOTH

Yoshikazu Sando, and Hiroshi Ishidoshiro, both of Wakayama, Japan, assignors to Sando Iron Works Co., Wakayama, Japan

Filed Mar. 23, 1979, Ser. No. 23,256
Claims priority, application Japan, Mar. 30, 1978, 53-41433[U]; Mar. 30, 1978, 53-41434[U]
Int. Cl.[2] D06B *3/16, 21/02, 23/04*
U.S. Cl. 68—62 **9 Claims**

1. An apparatus for the liquid treatment of a cloth compris-

ing an upwardly arranged, open top, U-shaped liquid tank, said tank consisting of an upper portion and a lower portion and at least the lower portion thereof arranged to contain a treating liquid, endless net conveyer means located within said upper and lower portions of said tank for conveying a cloth therethrough, said endless net conveyer means including a plurality of upwardly extending net conveyer sections, a first and a second said net conveyer sections disposed in relatively closely spaced relation within the upper portion of said tank and forming therebetween an inlet passage for feeding cloth downwardly into said tank, third and fourth said net conveyer sections disposed in relatively closely spaced relation in the upper part of said tank and forming therebetween an outlet passage for removing cloth upwardly from said tank, a plurality of liquid jet nozzles spaced apart along each of the opposite sides of said inlet and outlet passages and said jet nozzles on the opposite sides of said passages being offset in the upward direction relative to one another and positioned relative to said net conveyer sections forming said passages so that said jet



nozzles direct a treating liquid through said net conveyer sections in the generally horizontal direction for colliding alternatively with opposite sides of the cloth passing through said passages so that the cloth alternately collides with said conveyer sections forming the opposite sides of said passages, said conveyer means forming at least a side of a lower cloth passage located within said lower part of said tank and extending between the lower end of said inlet passage and the lower end of said outlet passage, said tank having a liquid level therein located at least at the upper end of said lower cloth passage, the opposed sides of said lower cloth passage being spaced a greater distance apart than said conveyer sections forming said inlet and outlet passages so that the cloth entering said lower cloth passage from said inlet passage assumes a folded over state and remains in the folded over state between the end thereof where the cloth enters said lower cloth passage from said inlet passage and the end thereof where the cloth exists from said lower cloth passage and enters said outlet passage.

4,231,239

SPRAY WASHER SYSTEM

Gary G. Lazaroff, 144 Gunston Hall Ct., Chesterfield, Mo. 63017

Filed Apr. 16, 1979, Ser. No. 30,451
Int. Cl.[3] D06F *35/00*
U.S. Cl. 68—205 R **5 Claims**

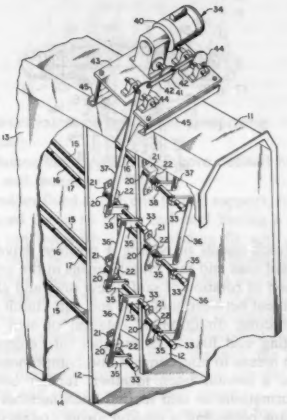
1. In a spray washing system for garments including a spray station through which garments are transported in a generally vertical plane, the spray station having a set of vertically spaced pipes with parallel axis extending generally parallel to said plane, each of said pipes forming an acute angle with the horizontal, a spray nozzle mounted on each of said pipes and arranged to direct a spray against garments in said plane, and means for rotatively oscillating the pipes about their axes to cause the spray area of the nozzles mounted thereon to oscillate, wherein the improvement comprises:

(a) the means for rotatively oscillating said pipes comprising means for interconnecting the vertically spaced pipes for simultaneously rotatively oscillating the vertically spaced pipes, the interconnecting means including:

1. bars rigidly connected to and extending from the pipes, and
2. links rotatively connected to the bars of two vertically spaced pipes on rotative axes parallel to the pipe axes for providing simultaneous movement of the interconnected bars,

(b) the means for rotatively oscillating the pipes further comprising an arm rotatively connected to a bar on one of said pipes on a rotative axis parallel to the axis of said one pipe for oscillating said pipes,

(c) the means for rotatively oscillating the pipes further comprising:



1. a motor means,
2. a drive wheel rotatively driven by the motor means,
3. the arm being operatively connected to the drive wheel for oscillating the arm,
4. a base mounted on the spray station, the base carrying the motor means and drive wheel,
5. a connecting rod having one end rotatively connected to the drive wheel, and
6. a lifter pivotally mounted to the base, the other end of the connecting rod being rotatively connected to the lifter, and the arm being rotatively connected to the lifter, the lifter being pivotally oscillated by the rod to oscillate the arm,

(d) the base is adjustably mounted to the spray station, the plane of the base being parallel to the axes of the pipes, and being at an acute angle with the horizontal, and

(e) the drive wheel connecting rod and lifter are mounted on rotative axes parallel to the plane of the base.

4,231,240

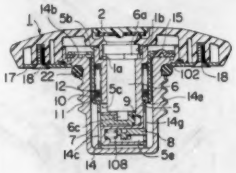
SCREW PLUG ASSEMBLY

Masao Fujita, Fukushima, and Kiyoshi Kitaori, Hiratsuka, both of Japan, assignors to Nissan Shatai Kabushiki Kaisha, Hiratsuka and Kokusan Kinzoku Kogyo Kabushiki Kaisha, Tokyo, both of, Japan

Filed Jul. 28, 1978, Ser. No. 929,194
Int. Cl.[3] B65D *55/14*
U.S. Cl. 70—173 **6 Claims**

1. A screw cap assembly comprising a manually rotatable handle piece, a cylindrical case connected with said handle piece for rotation therewith, a key-operated cylinder lock

within said cylindrical case, said handle piece having an opening providing access for inserting a key into said lock to rotate said lock relative to said case between a locked position of the lock and an unlocked position of the lock, an externally threaded cylindrical screw plug surrounding said case, clutch means between said case and said screw plug for transmitting rotary motion from said case to said screw plug, means providing a driving connection between said clutch means and said plug and latch means carried by said case for effecting a drive connection between said case and said clutch means both in the screw advancing and screw retracting directions of rotation of said plug when said lock is in its unlocked position and for effecting a drive connection between said case and said clutch only in the screw advancing direction of rotation of said plug when said lock is in its locked position while allowing rotation of the case and handle piece relative to the plug in the screw retracting direction of the plug when said lock is in its locked position, said latch means including a first latch member, complimentary latching formations on said first latch member and



on said clutch means providing a positive drive connection between said case and said clutch means in the screw advancing direction of rotation of said screw plug and allowing relative movement between said case and said clutch means in the screw retracting direction of rotation of said screw plug, means urging said first latch member into engagement with said clutch means to interconnect said complimentary latching formations, a second latch member, further complimentary latching formations on said second latch member and on said clutch means providing a positive drive connection between said case and said clutch means in the screw retracting direction of rotation of said screw plug, further means urging said second latch member into engagement with said clutch means to interconnect said further complimentary latching formations and means providing a mechanical connection between said lock and said second latch member for withdrawing said second latch member from engagement with said clutch means and disconnecting said further complimentary latching formations when said lock is in its locked position.

4,231,241

VEHICLE SHIFTER LOCKING DEVICE

Frank F. Lipski, Los Angeles, Calif., assignor to Marshall A. Lerner, Los Angeles, Calif., trustee of Henry Bissell, a part interest

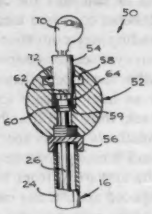
Filed Aug. 24, 1978, Ser. No. 936,631
Int. Cl.[2] B60R *25/06*; E05B *65/12*; G05G *1/04, 5/06*
U.S. Cl. 70—195 **12 Claims**

1. A shifter locking device for use with a shifter for an automatic transmission having a PARK position, which shifter includes a shift lever housing and a lockable central release post projecting therefrom which is operative to release a latching mechanism retaining the transmission in said PARK position, comprising:

a shifter grip adapted for attachment to the shift lever housing in a position encasing the projecting release post;

a lock member attachable to the release post within the shifter grip and projecting therefrom to permit a user, by moving said lock member, when in an unlocked state, to move the release post to release the transmission latching mechanism; and

means for preventing detachment of said shifter grip from said shift lever housing including shift grip retaining means located within the shifter grip between said lock member and said shift lever housing; and



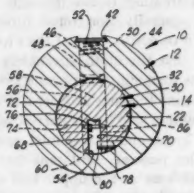
wherein said shift grip retaining means includes a nut threaded onto the release post and a washer positioned between said release post and said nut to thereby prevent detachment of said shifter grip from said shift lever housing when said lock member is in the locked state.

4,231,242

PLUG FOR A KEY OPERATED LOCK

Lewis J. Hill, Grove, and Bill J. Dillard, Mustang, both of Okla., assignors to U-Change Lock Industries, Inc., Oklahoma City, Okla.

Continuation of Ser. No. 800,699, May 26, 1977, abandoned.
This application Oct. 23, 1978, Ser. No. 953,932
Int. Cl.[3] E05B *15/06*
U.S. Cl. 70—347 **2 Claims**



1. An improved plug for a key operated lock having a lock body, comprising:

a cylindrical plug body removably supported by the lock body and having a key slot formed longitudinally therein, the plug body having a first internal surface defining one transverse limit of the key slot and a second internal surface defining another transverse limit of the key slot, the plug body having a plurality of stud bores intersecting the cylindrical periphery of the plug body and the first internal surface of the plug body, and the plug body having a plurality of stud bores intersecting the cylindrical periphery of the plug body and the second internal surface of the plug body;

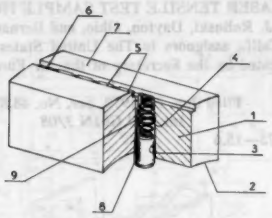
a first stud member secured within one of the stud bores intersecting the first internal surface and having a portion thereof projecting into the key slot; and

a second stud member secured within one of the stud bores intersecting the second internal surface and having a portion projecting into the key slot so that the first and second stud members coact to only permit entry into the key slot of a key having a preselected key blank design determined by the selected placement of stud members in the stud bores.

4,231,243
PIN TUMBLER LOCKS AND THEIR ASSEMBLY

André Thirion, Dijon, France, assignor to Antivols Simplex, France

Filed May 25, 1978, Ser. No. 909,456
Claims priority, application France, May 25, 1977, 77 15862
Int. Cl.[2] E05B *9/04, 15/14, 27/04*
U.S. Cl. 70—364 A 7 Claims

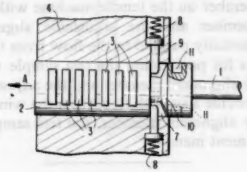


1. A tumbler lock comprising a body having an axial cylindrical hole in which a cylindrical plug is mounted for rotation, the plug comprising an axial key passage and a plurality of axially aligned radial holes opening into the said key passage and into the peripheral surface of the plug, a tumbler slidably mounted in each of the said radial holes, the body comprising a plurality of axially aligned radial holes opening into the said axial hole, a further tumbler biased towards the plug by means of a spring sliding in each of the radial holes of the body, each of said radial holes in the body having a cylindrical portion adjacent to the axial hole and a conical portion extending from said cylindrical portion and narrowing towards the periphery of the said body, said conical portion communicating with the exterior of the body and being dimensioned for having the associated further tumbler wedged therein.

4,231,244
CYLINDER LOCK, ESPECIALLY FOR MOTOR VEHICLES

Rolf Krügener, and Hermann W. Kurth, both of Sindelfingen, Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Oct. 19, 1978, Ser. No. 952,733
Claims priority, application Fed. Rep. of Germany, Oct. 28, 1977, 2748408
Int. Cl.[3] E05B *63/00*
U.S. Cl. 70—422 8 Claims

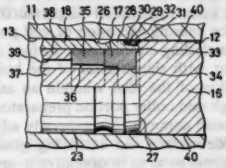


1. A cylinder lock, comprising rotor means having tumbler means which engage into at least one tumbler channel means provided in the inner wall of a stator means receiving the rotor means, when a key is pulled off in the locking position, said rotor means being operable to be connected with at least one locking element, characterized in that the rotor means is provided with an intentional rupturing place adjoining the last tumbler means, as viewed in the key insertion direction, which ruptures during a forcible pulling out of the rotor means, whereby an elastically engaging locking not accessible from the outside takes place between the rotor and stator means, characterized in that said elastically engaging locking is facilitated through the use of resiliently engaging locking means comprising at least one guided bolt means which, when the rotor is pulled out, initially contacts an inlet bevel, then yields resiliently, and finally engages an associated recess.

4,231,245
INDIRECT EXTRUSION APPARATUS

Jintaro Ishiba, Namerikawa, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Division of Ser. No. 773,147, Mar. 1, 1977, Pat. No. 4,144,734.
This application Nov. 20, 1978, Ser. No. 961,989
Int. Cl.[3] B21C *35/04, 27/00*
U.S. Cl. 72—253 A 6 Claims

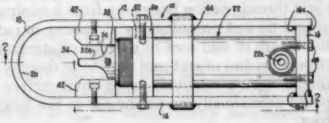


1. An indirect extrusion apparatus, comprising:
(a) a support;
(b) a container having a through bore defined by an inner surface and receptive of a billet;
(c) a die holder fixed at one end to said support, receptive of an orificed die at its other end, and having a peripheral surface portion with a close sliding fit with said inner surface, there being a generally axially facing annular step surrounding that portion thereof which is receptive of the die and defining with said bore the end of an annular space extending to said other end without restriction;
(d) a retractable ram for moving said container and the billet to effect extrusion of the billet through the die orifice whereby impurities are collected as an annular portion of a butt by said step in said annular space;
(e) an actuator connected to said container for shifting the same when said ram is retracted from said container;
(f) a retractable gate extendable to a position to act between said support for the die holder and said container for enabling said actuator to dispose said container in a predetermined position with respect to said other end of said die holder which it surrounds; and
(g) a shear movable across the end of said bore for severing the butt of the billet from its annular portion and from the extrusion when in said predetermined position.

4,231,246
CRIMPING TOOL FOR TUBULAR-LIKE OBJECTS AND METHOD

Edward J. Gorenc, 19014 Chickasaw, Cleveland, Ohio 44119; Ulles E. Fox, 14406 Sylvia Ave., Cleveland, Ohio 44110, and Imre A. Lesko, 1318 Washington Blvd., Mayfield Hts., Ohio 44114

Filed Oct. 31, 1978, Ser. No. 956,368
Int. Cl.[3] B21D *15/03, 37/00*
U.S. Cl. 72—412 18 Claims



1. In a tool for exerting a crimping like force on a boiler tube or the like, mounted in relatively closely spaced relation to

other similar tube elements projecting generally laterally from an associated boiler drum, for physically deforming the tube from the exterior thereof along an area running generally lengthwise of the tube for removal of the latter from attachment to the drum comprising, a frame, reciprocal fluid power means mounted on said frame and adapted for extension and retraction generally lengthwise of the frame, said frame including a closed, relatively thin collar portion at one end thereof disposed generally symmetrically on opposite sides of an axis running lengthwise of said frame and generally parallel to the direction of extension and retraction of said power means, said collar portion being adapted to receive therethrough an associated tube, and a force applying non-piercing head secured to said power means for applying deforming force to the tube when the latter is disposed in extending relation through said collar portion of said frame between said collar portion and said head, and upon application of pressurized fluid to said power means for causing extension of said power means, said collar portion including an underside surface adapted for general engagement with the exterior of the boiler drum in the operative position of the tool wherein an associated tube is received through said collar portion preparatory to removal of the tube, said head commencing generally adjacent the plane of said underside surface and extending generally vertically upwardly therefrom so as to be operative to apply the deforming force lengthwise of the associated tube commencing generally adjacent the connection of the associated tube to the boiler drum.

4,231,247

DENT STRAIGHTENING TOOL

Charles R. Haydon, No. 20, Seattle Motor Ct., 19326 Pacific Hwy. S., Seattle, Wash. 89188

Filed May 7, 1979, Ser. No. 36,434
Int. Cl.³ B21D *1/12*
U.S. Cl. 72—479 **4 Claims**

1. A tool for use in straightening a dent in a sheet metal skin, comprising:

(a) an elongate shaft;

(b) an integral handle at one end of said shaft; and

(c) work piece engaging, helical threads integrally formed in the opposite end of said shaft, said threads comprising,

(1) a substantial constant diameter root portion;

(2) a tapered thread portion disposed along the length of said root;

(3) a blunt tip at the distal end of said thread portion opposite said handle; and

(4) said thread portion beginning from a minimum radius at said tip and progressively increasing in radius along the length of said root to a depth substantially greater than the radius of said root portion to thereby provide a thread with a relatively large anvil surface area disposed substantially perpendicular to the length of said root,

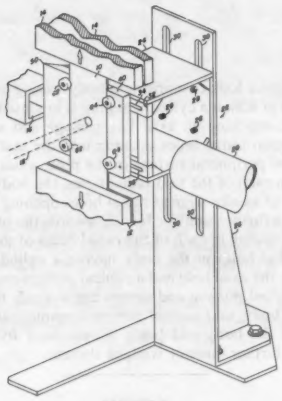
so that when the tool is threadably engaged within an initial hole provided in the dented sheet metal of a diameter slightly larger than the root diameter, only a narrow slit is formed in the dented sheet metal extending radially from the initial hole for a distance corresponding to the maximum radius of said threads to thereby provide a substantial anvil contacting surface against which the dented sheet metal can bear when the tool is pulled in an outwardly direction.

4,231,248

LASER TENSILE TEST SAMPLE HOLDER

Edmund J. Rolinski, Dayton, Ohio, and Bernard Laub, Cupertino, Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 15, 1979, Ser. No. 48,875
Int. Cl.³ G01N *3/08*
U.S. Cl. 73—15.6 **4 Claims**



1. In combination with a system for the simultaneous laser, wind tunnel and tensile machine testing of flat plate test samples wherein the tensile machine is located to approximately align the test sample parallel to the flow from a wind tunnel nozzle; a test sample holder for maintaining substantial alignment of the test sample parallel to the wind tunnel flow, comprising: a frame member; a stationary sample alignment member secured to the frame member, upstream in the wind tunnel flow from the test sample; an adjustable sample alignment member secured to the frame member, downstream in the wind tunnel flow from the test sample; means for supporting said frame member on the tensile machine with the stationary alignment member and the adjustable alignment member aligned substantially parallel to the flow from the wind tunnel nozzle; means for positioning the test sample with respect to the stationary alignment member and the adjustable alignment member to provide a smooth flow from the wind tunnel across the stationary alignment member, the test sample and the adjustable alignment member.

4,231,249

APPARATUS AND METHODS FOR MONITORING CONCENTRATIONS OF TOXIC SUBSTANCES IN A WORK ENVIRONMENT

Matthew M. Zuckerman, Palo Alto, Calif., assignor to Sierra Labs, Inc., Sunnyvale, Calif.

Filed Mar. 20, 1979, Ser. No. 22,285
Int. Cl.³ G01N *27/18*
U.S. Cl. 73—23 **9 Claims**

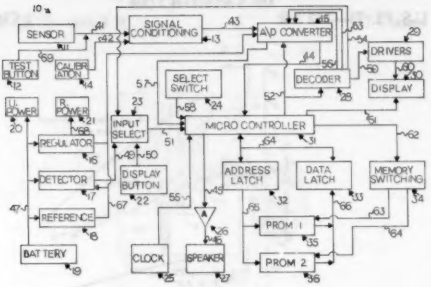
1. A portable, personal monitor for measuring and displaying the concentrations of toxic substances to which an individual wearing the monitor is exposed during a shift or other work period of the individual, said monitor comprising,

sensor means for sensing the concentration level of the toxic substance in the air ambient to the monitor and effective to produce an analog signal having a magnitude dependent on the concentration level,

convertor means for converting the analog signal to a digital signal corresponding to the sensed concentration level,

controller means for

(a) indicating the present concentration level sensed by the monitor,



(b) determining and storing the maximum concentration level sensed during the work period, and

(c) computing and storing a time-weighted average of the concentration levels sensed during the work period, and

case means for mounting and housing the sensor means, convertor means, and controller means and constructed for wear by an individual whose exposure to the toxic substance is to be monitored during the work period.

4,231,250

APPARATUS FOR CONTINUOUS MEASUREMENT OF THE LIQUID LEVEL IN A CONTAINER

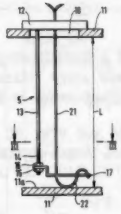
Dieter Leber, Eschborn, Fed. Rep. of Germany, assignor to VDO Adolf Schindling AG, Frankfurt, Fed. Rep. of Germany

Filed Jun. 25, 1979, Ser. No. 51,813

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1978, 2835744

Int. Cl.³ G01F *23/28*

U.S. Cl. 73—290 V **10 Claims**



1. Apparatus for continuous measurement of the liquid level in a container having a floor, particularly a fuel tank of a motor vehicle, wherein a flexible, multiple-strand band cable is secured to the container and is an oscillation-determining element of an oscillator, the output of which communicates with a device to be operated thereby, such as a control or display stage, and wherein the length of the sensor is larger than the length required for the sensor to reach to the floor of the container, said sensor having at least a portion thereof doubled upon itself to define an arc or loop at the floor of the container, and support means engaging the sensor and holding the arc or loop means in constant, predetermined relationship relative to the container floor.

4,231,251

APPARATUS FOR SENSING SCHNARREN PHENOMENON IN FUEL INJECTION LINE

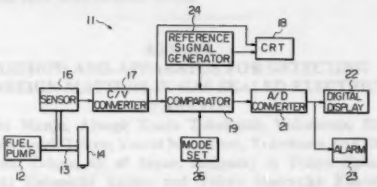
Hiroshi Hatsuno; Jinpei Fukazawa; Mitsuo Fukushima, and Shinji Ogawa, all of Higashimatsuyama, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Apr. 17, 1979, Ser. No. 30,916

Claims priority, application Japan, Apr. 24, 1978, 53/48420

Int. Cl.³ G01M *19/00*

U.S. Cl. 73—119 A **6 Claims**



2. An apparatus for sensing a Schnarren phenomenon in a fuel injection line, characterized by comprising:

sensor means connected to the line for producing an electrical signal corresponding to fluid pressure in the line;

reference signal means for producing a reference signal having a predetermined frequency;

display means for displaying the electrical signal and the reference signal; and

comparator means for comparing a frequency of the electrical signal with a frequency of the reference signal and producing an output indicating a difference therebetween.

4,231,252

BOREHOLE DIRECTION MEASUREMENT MEANS

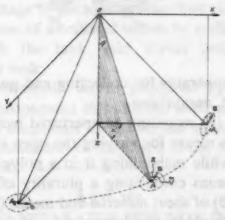
Leonard A. Cherkson, Mt. Isa, Australia, assignor to Mount Isa Mines Limited, Brisbane, Australia

Filed Nov. 20, 1978, Ser. No. 961,898

Claims priority, application Australia, Nov. 24, 1977, 2534

Int. Cl.³ E21B *47/024*

U.S. Cl. 73—151 **18 Claims**



1. Means for providing data for determining a change from one direction to another of a reference axis fixedly associated with a body, when at least one of said directions is non horizontal, comprising:

first gravity sensor means defining a first sensor direction which is at a constant sensor angle with respect to said reference axis, for producing a first signal or signals responsive to the component of the earth's gravity vector in said first sensor direction,

a mass fixedly associated with said body and mounted for undriven rotation about said reference axis, said first sensor means being, or being fixedly associated, with said mass; the inertia of said mass being such that said sensor direction at any instant is substantially independent of rotation of said body about said reference axis,

drive means whereby said mass may be driven to a predeter-

mined angular velocity about said reference axis and then allowed to rotate undriven, and

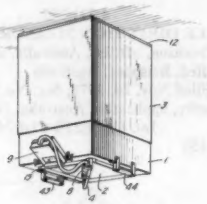
means for comparing selected parameters of said first signal or signals as occurring during one time period with said selected parameters as occurring during another time period.

4,231,253

AIR-FLOW CAPTURE AND CONTROL DEVICE FOR FLOW MEASUREMENT

Buff Ohnhaus, 120 Jackson NE., Albuquerque, N. Mex. 87108, and James D. Faith, 9804 Mary Ellen Pl. NE., Albuquerque, N. Mex. 87111

Filed Jun. 4, 1979, Ser. No. 45,051
Int. Cl.³ G01F *1/46*
U.S. Cl. 73—861.62 **11 Claims**



1. Portable apparatus for collecting and guiding an airflow to be measured, comprising:

a first frame **(1)** mounting an apertured panel **(25)** and provided with means for varying the open area of the panel aperture while maintaining it in a polygonal shape, said varying means comprising a plurality of movable members **(32–35)** of sheet material and means **(38–42)** for moving said members simultaneously and for indicating the aperture area defined by said members;

means **(4)** supported on said first frame for mounting the probe **(8)** of an air-velocity-meter adjustably with reference to the center of said aperture and for mounting the indicating portion **(9)** of said air-velocity-meter on said frame in an attitude making it easily readable by a person holding up said apparatus;

means **(27)** for sealing said members of said varying means with respect to said apertured panel **(25)**;

a hood **(3)** foldable into said first frame and having folding legs **(46–50)** and a second frame **(52,12)** arranged to be held parallel to said first frame when said hood is erected; and

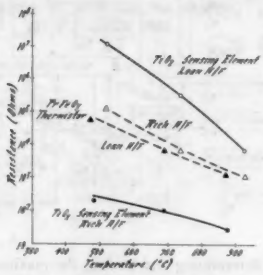
vanes **(71–74)** hingedly connected to said legs, firmly engageable together within said hood in the central region thereof, with their surfaces parallel to the axis of said hood when said hood is erected.

4,231,254

RARE EARTH OR YTTRIUM, TRANSITION METAL OXIDE THERMISTORS

Eleftherios M. Logothetis, Birmingham; Kamlakar R. Laud, and John K. Park, both of Ann Arbor, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 857 ,498, Dec. 5, 1977, Pat. No. 4,162,631.
This application Mar. 12, 1979, Ser. No. 19,794
The portion of the term of this patent subsequent to Jul. 31, 1996, has been disclaimed.
Int. Cl.³ G01K *7/18*
U.S. Cl. 73—362 AR **1 Claim**



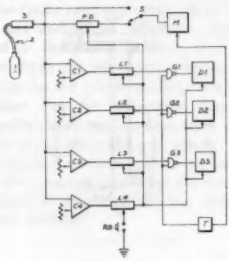
1. A thermistor that senses temperature in an oxygen varying environment, which comprises a compound corresponding to the formula $PrFeO_3$.

4,231,255

RATE MEASURING DEVICE FOR JOINT AND/OR MUSCULAR PERFORMANCE

Andre L. Haski, 224 Military Rd., Dover Heights, New South Wales 2030, Australia, and Cyriacus A. Bleys, Coogee, Australia, assignors to said Andre L. Haski, New South Wales, Australia, by said Cyriacus A. Bleys

Filed Jun. 25, 1979, Ser. No. 51,670
Claims priority, application Australia, Jul. 5, 1978, PD4951
Int. Cl.³ G01L *5/02*
U.S. Cl. 73—379 **9 Claims**



1. A rate measuring device for measuring joint and/or muscular performance, said device comprising a sealed bladder containing a fluid and adapted to be squeezed through the action of the joint and/or muscle the performance of which is to be tested; a pressure transducer in fluid communication with said bladder and providing an output indicative of the instantaneous pressure of said fluid; a plurality of comparators each connected to the output of said pressure transducer, the output of each comparator being enabled when said pressure transducer indicates that a corresponding one of a plurality of different predetermined pressure thresholds has been exceeded, the number of said thresholds corresponding to the

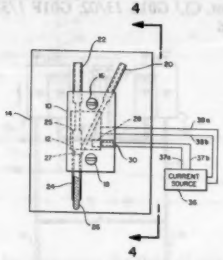
number of said comparators; and timing and recording means operable by said comparators to record the time at which each pressure threshold is exceeded.

4,231,256

THERMOELECTRIC GAS DRYER

Robert L. Chapman, La Habra, and John N. Harman, III, Placentia, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Feb. 5, 1979, Ser. No. 9,203
Int. Cl.³ G01N *1/22*
U.S. Cl. 73—421.5 R **17 Claims**



1. An apparatus for drying a flowing sample stream of gas containing moisture, said apparatus comprising:

housing means having three paths intersecting at a predetermined point within said housing;

an inlet coupled to a first of said three paths to receive said sample gas stream;

an outlet coupled to a second of said three paths to exhaust said sample gas stream;

wick means disposed within a third of said three paths, said wick means having one end situated to absorb and transmit any condensate out of the flow of said sample gas stream;

cooling means coupled to said housing means and responsive to temperature changes for maintaining the temperature of said housing below the dew point of said sample gas stream;

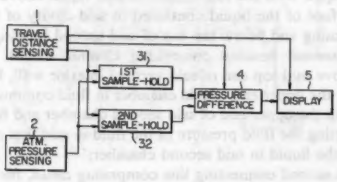
sensor means associated with said cooling means to sense the temperature of said housing and control the heat dissipation of said cooling means.

4,231,257

SLOPE SENSOR FOR A VEHICLE

Yasuhisa Yoshino, Okazaki; Akira Kuno, Oobu, and Yoshio Shinoda, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Apr. 20, 1979, Ser. No. 31,968
Claims priority, application Japan, Jun. 23, 1978, 53/76776
Int. Cl.³ G01C *23/00*
U.S. Cl. 73—432 CR **2 Claims**



1. A slope sensor for a vehicle comprising:

travel distance sensor means for generating a timing signal each time a vehicle travels a predetermined distance;

atmospheric pressure sensing means for generating an electric signal corresponding to an atmospheric pressure;

first and second sample-hold means, connected to said travel distance sensor means and said atmospheric pressure sensor means, for alternately sample-holding said electric signal corresponding to an atmospheric pressure in response to said timing signal; and

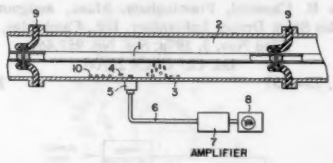
comparator means, connected to said first and second sample-hold means and said travel distance sensor means, for detecting a difference value of said electric signal held by said both sample-hold means.

4,231,258

METHOD AND APPARATUS FOR DETECTING FOREIGN MATTERS IN GAS SEALED ELECTRIC APPARATUS

Shinichi Menju, Atsugi; Kunio Takahashi, Yokohama; Eiichi Haginomori, Tokyo; Yoichi Murakami, Yokohama, and Eiichi Zaima, Tokyo, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha and Tokyo Denryoku Kabushiki Kaisha, both of Tokyo, Japan

Filed Jan. 2, 1979, Ser. No. 571
Claims priority, application Japan, Jan. 19, 1978, 53-3711; Jan. 19, 1978, 53-3712
Int. Cl.³ G01N *29/04*
U.S. Cl. 73—572 **2 Claims**



1. In a method for detecting for the presence of foreign matter in a gas sealed electrical apparatus including a tank at ground potential and containing an insulating gas and having a high voltage live element disposed in the tank, the improvement which comprises:

applying a voltage to the high voltage live element for causing generation of ultrasonic waves by collision of foreign matter with the tank, said waves being propagated through the tank;

sensing the ultrasonic waves produced by said collision which are propagated through the tank; and,

indicating the magnitude of the sensed ultrasonic waves to enable determination of the shape of the foreign matter.

4,231,259

METHOD AND APPARATUS FOR NON-DESTRUCTIVE EVALUATION UTILIZING THE INTERNAL FRICTION DAMPING (IFD) TECHNIQUE

Alagu P. Thiruvengadam, 10509 William Tell La., Columbia, Md. 21044, and Ambrose A. Hochrein, Jr., 18521 Kilt Ter., Olney, Md. 20832

Filed Aug. 11, 1978, Ser. No. 933,114
Int. Cl.³ G01N *29/00*
U.S. Cl. 73—584 **23 Claims**

1. A method for detecting an incipient flaw in an object by measurement of the specific damping capacity of the object, comprising the steps of:

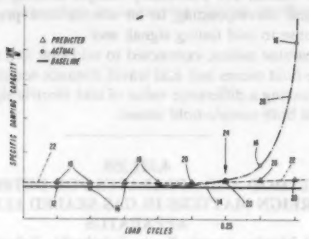
inducing an excitation having a predetermined amount of energy in the object to produce a stress in the anelastic stress range;

measuring a value indicative of changes in the specific damping capacity occurring in the object;

recording the measured value;

periodically repeating the steps of inducing, measuring and recording;

determining from the recorded values a baseline for the specific damping capacity of the object;



establishing a set of predetermined values which indicates the expected relationship of said measured values to said baseline; and

thereafter checking at intervals for a difference which is greater than a predetermined amount between the recorded values and the predetermined values.

4,231,260

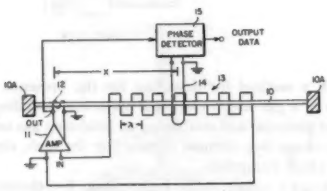
POSITION DETERMINING SYSTEM

Jacques R. Chamuel, Framingham, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Filed Nov. 3, 1978, Ser. No. 957,462

Int. Cl.³ G01N *29/00*

U.S. Cl. 73—597 **21 Claims**



1. A position determining system comprising

at least one delay means capable of supporting a signal which travels along said delay means;

first transducer means coupled to said delay means and capable, when activated, of producing a traveling signal having at least one selected frequency, which signal travels along said delay means;

at least one second transducer means coupled to said delay means and responsive to said traveling signal to produce at least one electrical signal having said at least one selected frequency;

amplifier means responsive to said at least one electrical signal and capable of producing an output signal comprising a plurality of signal components of different frequencies, at least one of said signal components having said at least one selected frequency, said at least one electrical signal being arranged to be in phase with the at least one signal component having said at least one selected frequency;

means for supplying said output signal to said first transducer means to activate said first transducer means;

receiver transducer means relatively movable with respect to said delay means and coupled thereto for detecting said traveling signal as it travels past said receiver transducer means;

means for determining the delay of said detected signal as it travels from said first transducer means to said receiver transducer means whereby the position of said receiver transducer means relative to said first transducer means is determined; and

means for substantially reducing reflections of said traveling signal in said delay means.

4,231,261

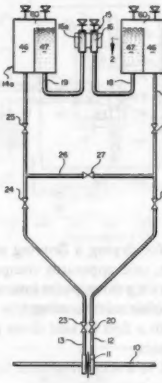
FLUID PRESSURE MEASURING DEVICE

Charles W. Elmer, Merrillville, Ind., assignor to Inland Steel Company, Chicago, Ill.

Filed May 21, 1979, Ser. No. 41,107

Int. Cl.³ G01L *13/02*; G01F *1/38*

U.S. Cl. 73—716 **8 Claims**



1. In a device for measuring the fluid pressure in a fluid-conducting conduit:

a first housing;

a cavity in said first housing, said cavity having a top, a bottom and side walls;

a diaphragm defining one wall of said cavity;

said first housing comprising means defining the other walls of said cavity;

said cavity comprising means for containing a liquid;

a second housing having a top, a bottom and side walls;

said second housing including a rigid, vertical interior wall terminating at a top end and dividing said second housing into two vertically disposed chambers each having an upper end and a lower end;

a first connecting line comprising means for placing a first of said two chambers in fluid communication with said fluid-conducting conduit and for transmitting to said first chamber the fluid pressure of the fluid in said conduit;

said first chamber comprising means for containing therein the fluid from said conduit;

a second of said chambers comprising means for containing a liquid with the top surface of said liquid above the top surface of the liquid contained in said cavity of the first housing and below the top of said second housing;

said second housing comprising channel means, located above said top end of said vertical interior wall, for placing the upper end of said chamber in fluid communication with the upper end of said second chamber and for transmitting the fluid pressure of the fluid in said first chamber to the liquid in said second chamber;

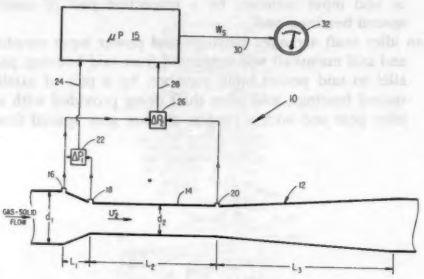
and a second connecting line comprising means for placing the bottom of said second chamber in liquid communication with the bottom of said cavity to transmit the fluid pressure on the liquid in said second chamber to the liquid in said cavity.

4,231,262

SYSTEM FOR MEASURING ENTRAINED SOLID FLOW

Richard H. Boll, deceased, late of Alliance, Ohio (by United National Bank & Trust Co., executor), and Walter L. Ghering, Alliance, Ohio, assignors to The Babcock & Wilcox Company, New York, N.Y.

Filed Mar. 28, 1979, Ser. No. 24,769
Int. Cl.³ G01F *1/74*
U.S. Cl. 73—861.04 **5 Claims**



1. A system for measuring the flow of solids entrained in a fluid stream comprising:

a venturi assembly for passing the fluid stream therethrough having a converging section, a constant diameter section, and a diverging section;

a pair of pressure measuring devices connected to said venturi assembly to measure the pressure drop across different points of said venturi, said first measuring device measuring the pressure drop across the converging section of said venturi assembly and the second measuring device measuring the pressure drop across the converging and the constant diameter section of said venturi assembly; and

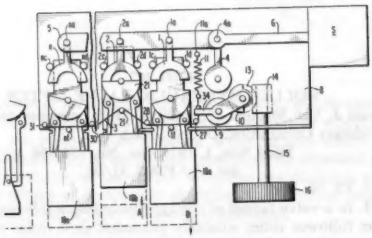
circuit means connected to said pair of pressure measuring devices to calculate the flow of solids through said venturi assembly according to a predetermined equation which is a function of the pressure drops across said venturi.

4,231,263

MANUAL AND AUTOMATIC CONTROL DEVICE FOR ELECTRONIC EQUIPMENT AND OTHERS

Luis M. Antonello, via XXI Aprile, 12, Rome, Italy

Filed Dec. 27, 1973, Ser. No. 428,952
Claims priority, application Italy, Dec. 29, 1972, 55132 A/72
Int. Cl.² F16H *35/18;* H01H *9/26;* H03J *5/06*
U.S. Cl. 74—10.33 **17 Claims**



1. A mechanical memory device comprising:

(a) a transverse bar,

(b) means supporting said bar for generally transverse movement relative to its longitudinal axis,

(c) input means for moving said bar to plural selected positions,

(d) plural means each for defining a distinct position of said bar, each comprising an element pivotally connected to said bar and rotatable relative to said bar upon movement thereof, said elements being spaced along said bar and each said element having engagement means having a distinct position for each position of said bar, and

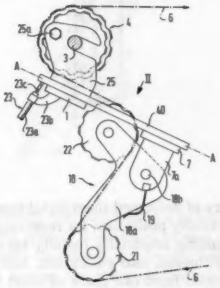
(e) plural means for sensing selected positions of said bar, for storing said sensed positions and for actuating said bar to cause it to occupy positions thereof corresponding to said stored positions each comprising means movable transversely to said bar and having means for sensing and storing the position of said engagement means of said element, said sensing and storing means comprising means for engaging said engagement means movably carried by said transversely movable means.

4,231,264

DERAILLEUR MECHANISM

Eduard Bergles, Graz, Austria, assignor to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany

Filed Aug. 22, 1978, Ser. No. 936,569
Claims priority, application Fed. Rep. of Germany, Sep. 2, 1977, 2739543
Int. Cl.² F16H *7/22*
U.S. Cl. 474—80 **29 Claims**



1. A derailleur mechanism for the rear wheel of a bicycle and like vehicle comprising:

(a) a support element;

(b) mounting means for mounting said support element on said vehicle in a fixed position relative to the axis of rotation of said wheel;

(c) an elongated link member;

(d) an elongated guide member, each of said members including first and second longitudinal end portions;

(e) first and second pivot means respectively connecting said first longitudinal end portions to said support element for angular movement of said members relative to said support element;

(f) a carrier element;

(g) third and fourth pivot means respectively connecting said second longitudinal end portions to said carrier element for angular movement of said members relative to said carrier element;

(h) fifth pivot means connecting respective portions of said members intermediate said end portions thereof for relative angular movement of said members,

(1) said pivot means defining respective pivot axes extending in a common direction,

(2) said first, third, and fifth pivot means preventing significant longitudinal movement of said link member relative to said support element, said carrier element, and said guide member respectively,

(3) said second and fourth pivot means permitting move-

ment of said end portions of said guide member substantially in the direction of guide member elongation relative to said elements respectively;

(i) a chain wheel mounted on said carrier element for rotation in a plane substantially transverse to said axis of rotation in said fixed position of said support element; and

(j) operating means for moving said members relative to each other about the pivot axis of said fifth pivot means.

4,231,265

TOOTH GRIP BELT PULLEY

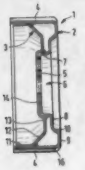
Horst Hanisch, Aidlingen; Heinrich Winkelmann, Ahlen, and Adolf Fischer, Haar, all of Fed. Rep. of Germany, assignors to Winkelmann and Pannhoff and Bayerische Motoren Werke Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 9, 1977, Ser. No. 859,179

Claims priority, application Fed. Rep. of Germany, Dec. 9, 1976, 2655909

Int. Cl.³ F16H *55/44*

U.S. Cl. 474—152 **13 Claims**



1. A belt pulley of deformed sheet metal comprising a pulley rim, hub means axially positioned for receiving a shaft end and web means extending essentially radially between said pulley rim and said hub means, said pulley rim, hub means and web means being formed from one piece of sheet metal characterized in that the hub means is constructed pot-shaped and includes a cylindrical wall constructed as interference seat for a shaft end and a bottom wall constructed as axial abutment for the shaft end, the edge of the hub means passing over into the web means of the pulley, and characterized in that the bottom wall of the hub means is constructed double-walled of two sheet metal parts, in that one sheet metal part extends up to areal connecting places of the other sheet metal part, and in that the two sheet metal parts are non-detachably connected with each other at the bottom of the hub means as also at said connecting places.

4,231,266

LUBRICATING DEVICE FOR POWER TRANSMISSION UNIT

Kazuyoshi Nishikawa; Makoto Uno, and Hideaki Koga, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jul. 31, 1978, Ser. No. 929,235

Claims priority, application Japan, Oct. 12, 1977, 52/122273

Int. Cl.² F16H *57/04;* F16N *7/26*

U.S. Cl. 74—467 **7 Claims**

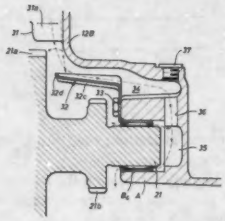
1. In a power transmission unit for a motor vehicle comprising:

a housing to be secured to a cylinder block of an engine, said housing having upper and lower chambers therein;

a power input member located within said housing for connection to a crankshaft of the engine by means of a disengageable coupling arranged within the upper chamber of said housing, the power input member being supported from said housing by a pair of axially spaced bearings;

a change-speed gearing means arranged within the lower chamber of said housing and having a mainshaft and a countershaft, each supported from said housing, parallel to said input member, by a respective pair of axially spaced bearings; and

an idler shaft arranged between said power input member and said mainshaft and supported from said housing, parallel to said power input member, by a pair of axially spaced bearings, said idler shaft being provided with an idler gear and with a reverse driving gear spaced from



said idler gear, said idler gear meshing in a common vertical plane with a driving gear on said power input member and with an input gear on said mainshaft, and said reverse driving gear being adapted to mesh in a common vertical plane with a reverse gear axially spaced from said input gear on said mainshaft by way of a reverse idler gear on a reverse idler shaft;

the improvement wherein said housing is provided on the inner wall thereof with a protrusion located above said idler gear and having a vertical guide face to be splashed with lubricating oil pumped up by rotation of said idler gear, and an oil receiver is secured to a bearing boss of said housing, said receiver having a guide portion located above said reverse driving gear and inclined toward the bearing on said idler shaft in the region of said reverse driving gear to receive the oil dropping from said protrusion.

4,231,267

ROLLER HYDRAULIC VALVE LIFTER

Louis J. Van Slooten, West Olive, Mich., assignor to General Motors Corporation, Detroit, Mich.

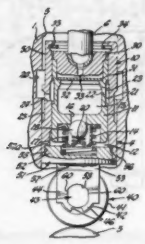
Filed Nov. 1, 1978, Ser. No. 956,644

Int. Cl.² F16H *53/06*

U.S. Cl. 74—569 **2 Claims**

1. In a valve tappet of the type including a follower with a cam follower roller rotatably journaled on a roller shaft, the improvement wherein said follower has two pairs of oppositely facing depending struts thereon with a roller space therebetween, each said strut including a depending tang at the free end thereof; each said pair of said struts having a shaft space between facing said struts aligned with the shaft space of

the other said pair of said struts and, wherein said roller shaft includes an intermediate circular journal portion on which said cam follower roller is journaled and free end portions at opposite ends thereof; each said free end portion having opposed flats thereon, each said flat being connected by a radial abutment shoulder to said circular journal portion, said free ends with said flats thereon of said roller shaft being slidably received in said shaft spaces with said roller shaft then retained against axial movement in opposite directions by abutment of the said abutment shoulders against said struts, the free ends of said depending tangs of each said pair of said struts being positioned so as to at least partly encircle said free end portions of said roller shaft whereby to retain said roller shaft and therefor the cam follower roller to said follower in unit assembly therewith.



4,231,268

FLYWHEEL FOR SMALL SIZE TAPE RECORDER

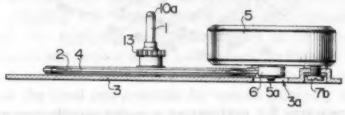
Akira Osanai, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jul. 27, 1977, Ser. No. 819,368

Claims priority, application Japan, Jul. 30, 1976, 51/91153

Int. Cl.³ G05G *3/00*

U.S. Cl. 74—572 **5 Claims**



1. A flywheel for a small size tape recorder, the flywheel being directly engaged at its periphery by an output wheel of a motor, the output wheel rotating about an axis which is substantially parallel to the axis of rotation of the flywheel so that upon rotation of the output wheel in one direction the flywheel rotates in an opposite direction, the flywheel being constructed to satisfy the following relationship;

$$I_F = I_M \times n$$

where I_M represents the moment of inertia of the motor about its output shaft, I_F the moment of inertia of the flywheel, and n the ratio W_M/W_F wherein W_M and W_F represent the angular velocity of the output shaft of the motor and the flywheel, respectively, whereby the angular momentum of the flywheel substantially balances the angular momentum of the output wheel.

4,231,269

Patent Not Issued For This Number

4,231,270

ELECTRICALLY DRIVEN FASTENING APPLIANCE

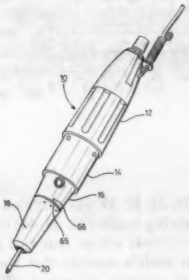
Katsuyuki Totsu, No. 1-17-8, Higashi-Mukojima, Sumida-ku, Tokyo, Japan

Filed Jul. 5, 1978, Ser. No. 922,127

Claims priority, application Japan, Jul. 7, 1977, 52-81381; Sep. 13, 1977, 52-109444

Int. Cl.³ B25D *23/142*

U.S. Cl. 81—474 **6 Claims**



1. A power fastening tool comprising a housing closed at one end, a tool driving spindle journalled at said closed end and extending outwardly therefrom, an electric motor mounted in said housing and having the drive shaft extending therefrom and an automatic clutch control planetary gear system interconnecting said motor drive shaft and said spindle, said gear system comprising a central gear fixed to said motor drive shaft, a plurality of planetary gears arranged around said central gear supported on a planet carrier connected to said spindle and drivable by said central gear and an annulus member having an internal gear which coacts with the planetary gears for revolution about the central gear, said annulus member having one end closed to form a face in opposition to the closed end of said housing, said annulus face and said closed end being provided with resiliently engagable clutch means operating to respectively maintain said annulus member stationary relative to said housing on application of a first torque not exceeding a predetermined level and to permit rotation of said annulus member with respect to said housing on application of a second torque greater than said predetermined level.

4,231,271

ATTACHMENT FOR BOLT TIGHTENING AND REMOVING DEVICE

Keiichi Yamada, 20-19, Hancho 4-Chome, Minou-Shi Osaka Prefecture, Japan

Continuation-in-part of Ser. No. 788,308, Apr. 18, 1977. This application Dec. 19, 1978, Ser. No. 971,053

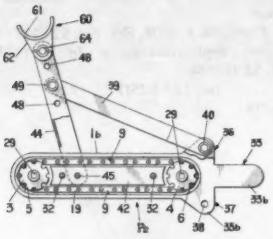
Claims priority, application Japan, Dec. 21, 1977, 52-173075[U]

Int. Cl.³ B25B *17/00*

U.S. Cl. 81—57.3 **8 Claims**

1. An attachment (P1; P2) for a tightening and removing

device (18; 25) for objects such as bolts, nuts and the like, comprising: an elongated casing (2; 26); an input shaft (14; 28) journaled at one end of said casing for attaching said tightening and removing device; a chain wheel (4) lodged in said casing and formed integrally with said input shaft; an output shaft (16; 28) journaled at the other end of said casing for attaching a socket (15) that serves to grip the objects; a second chain wheel (3) lodged in said casing and formed integrally with said output shaft; an endless chain (19) lodged longitudinally in and along said casing for interconnecting said wheels; reaction force



receiving means (21, 22; 33, 39, 44) provided in said casing, said reaction force receiving means (33, 39, 44) including a reaction force receiving lever (44) whose rear end is attached (45) to said casing (26) in such a manner that the free end thereof serves to contact the objects; and means (36, 37, 40) for selectively attaching a supporter (39) to said casing (26) and for selectively projecting said reaction force receiving lever (44) to either side of said casing, towards the outside of said output shaft (28), according to the direction in which the reaction force is made to work.

4,231,272

TRIM CHUTE AND METHOD

Jere W. Crouse, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Filed Oct. 10, 1978, Ser. No. 949,788

Int. Cl.³ B65H *35/02, 29/24*

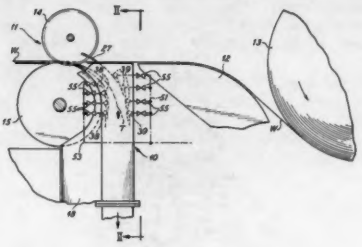
U.S. Cl. 83—98 **23 Claims**

1. A trim chute assembly for receiving trim strip severed by a slitter from the margin of a travelling web, comprising:

chute means defining a generally downwardly extending passageway for guiding the trim strip along a path downwardly away from the slitter;

said chute means having opposed spaced passageway-defining wall surfaces between which the trim strip is adapted to pass freely downwardly in the passageway;

and means for supplying low velocity air downwardly and biasing the air generally toward and then to flow downwardly along said wall surfaces with enhanced coanda effect and providing cushioning, lubricating air layers which move substantially parallel to the direction of travel of the trim strip and at a controlled velocity about the same as the speed of travel of the travelling web so that as the air layers move downwardly along said path between said chute means wall surfaces and both of said



opposite faces of the trim strip flotation of the strip downwardly in the passageway free from contact with said surfaces is effected and movement of the strip away from the slitter along said path is facilitated.

4,231,273

APPARATUS FOR PERFORATING A PAPER SAMPLE

Alfred Walter, Schlieren, Switzerland, assignor to Alfred Walter AG, Schliereh, Switzerland

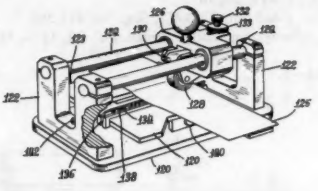
Division of Ser. No. 867,622, Jan. 6, 1978, Pat. No. 4,133,203.

This application Oct. 25, 1978, Ser. No. 954,331

Claims priority, application Switzerland, Jan. 10, 1977, 258/77

Int. Cl.³ B26D *3/08*

U.S. Cl. 83—510 **2 Claims**

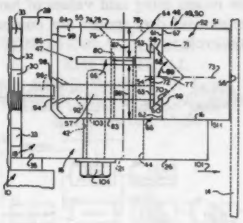


1. Apparatus for perforating a paper sample comprising a base including a pair of spaced, horizontally extending plates which serve as a bed for the paper sample, an elongated, replaceable perforating blade mounted in the space between said plates with the perforated edge extending above the surface of said plates, a pair of spaced, parallel and horizontally extending rods supported above and by said base, a carriage carried by said rods for horizontal movement, a bell crank pivotally mounted to said carriage with one arm extending below said carriage, a wheel rotatably mounted to said one arm of said bell crank so as to be moveable along said blade by movement of said carriage, and means for adjusting the spacing between said carriage and said other arm of said bell crank so as to adjust the pressure of said wheel against the blade, whereby when the carriage is moved the wheel rides over the perforating blade to perforate the paper sample disposed between the perforating blade and the wheel.

4,231,274
SAW GUIDE ASSEMBLY

Gerald J. Matchette, 3339-236 St., Langley, British Columbia, Canada (V3A 4P6)

Filed Mar. 8, 1978, Ser. No. 884,609
Int. Cl.[3] B23D 55/08; B27B 13/10
U.S. Cl. 83—820 8 Claims



1. A clamping assembly for clamping a saw guide block of wearable material therein, the block having first and second engaging surfaces adjacent an inner face thereof, and an outer face remote from the inner face to serve as a wearing face to bear against a saw blade of a sawing apparatus, the clamping assembly and block being received in a holding means of the sawing apparatus for location relative to a datum surface of the sawing apparatus, the clamping assembly being characterized by:

(a) an assembly body having front and rear portions; the front portion having spaced apart first and second clamping elements with oppositely disposed first and second gripping and bearing surfaces respectively spaced on opposite sides of, and disposed parallel to, a clamp axis; the first and second gripping and bearing surfaces being adapted to engaged the first and second engaging surfaces respectively of the block, the clamping elements having respective root portions disposed remotely from the gripping and bearing surfaces and extending from the rear portion, the clamping elements being spaced apart by a gap extending forwardly from the rear portion, the rear portion extending essentially continuously between root portions of the clamping elements and between opposite end portions of the body to maintain the first and second clamping elements in alignment with one another, the clamping elements being adapted for movement towards each other about a bend axis disposed generally adjacent the root portions and generally parallel to the clamp axis,

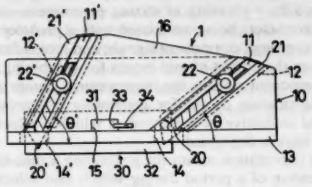
(b) clamping means disposed between the root portions and the gripping and bearing surfaces of the clamping elements for applying a clamping force to the clamping elements and thence to the guide block, so that the clamping force deflects the first clamping element generally about the bend axis towards the second clamping element to narrow the gap therebetween.

4,231,275
CUTTER FOR THIN BOARDS

Nobuo Onishi, 2-3, 3-chome, Tanaka, Minato-ku, Osaka, Japan

Filed Apr. 17, 1979, Ser. No. 30,878
Claims priority, application Japan, Oct. 19, 1978, 53-145582[U]
Int. Cl.[3] B26D 9/00, 11/00
U.S. Cl. 83—862 3 Claims

1. A cutter for cutting thin boards comprising a base having an even under surface and provided with a plurality of guide grooves on one side in such a manner that they are arranged so as to form progressively larger angles with said under surface, a plurality of cutting blades mounted in said guide grooves in such a manner that they fall on the same plane with each other,

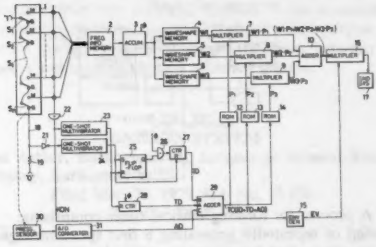


and a guide member adjustably provided in the lower part of said base.

4,231,276
ELECTRONIC MUSICAL INSTRUMENT OF WAVESHAPE MEMORY TYPE

Shigeo Ando, Iwata, and Takayasu Kondou, Hamamatsu, both of Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Aug. 30, 1978, Ser. No. 938,255
Claims priority, application Japan, Sep. 5, 1977, 52-105792
Int. Cl.[3] G10H 1/02
U.S. Cl. 84—1.19 14 Claims



1. A keyboard style electronic musical instrument comprising:

a plurality of waveshape storage means storing waveshapes with different tone colors, said waveshapes being same in fundamental frequency but different from each other in amount of harmonics;

addressing means responsive to the operation of a key of the keyboard for addressing said waveshape storage means to read out said waveshapes from the waveshape storage means at a repetition rate corresponding to a depressed key of the keyboard;

mixing means for mixing the waveshapes read out from said waveshape storage means, at a mixing ratio according to a mixing ratio control signal;

conversion means for converting the output of said mixing means to a corresponding musical tone;

touch-responsive means responsive to the operation of the key of said keyboard for generating a first touch-responsive signal corresponding to the initial speed at which the key of said keyboard is depressed, and a second touch-responsive signal corresponding to the strength of pressure with which the key is depressed;

generating means responsive to the operation of the key of said keyboard for generating a time-dependent signal changing with time after the key depression; and

producing means for producing said mixing ratio control signal on the basis of said first and second touch-responsive signals and said time-dependent signal.

10. In a keyboard type electronic musical instrument includ-

ing a keyboard having a plurality of keys; a plurality of waveshape storage means for obtaining a plurality of waveshape component signals having different harmonic content; means for combining said waveshape component signals in a ratio determined by a plurality of mixing parameters, each of said mixing parameters being associated with a predetermined one of said waveshape component signals; and means for obtaining sound from the output of said means for combining the waveshape component signals; the improvement comprising:

first information means for generating a depression-speed signal indicative of the speed at which a selected one of said keys is depressed;

second information means for generating a time-lapse signal indicative of a period during which said selected one of the keys is depressed;

third information means for generating an applied-pressure signal indicative of the pressure with which said selected one of the keys is depressed; and

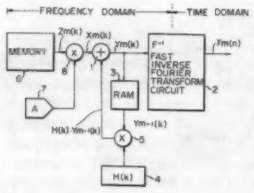
means responsive to said depression-speed signal, said time-lapse signal, and said applied-pressure signal for providing said plurality of mixing parameters.

4,231,277

PROCESS FOR FORMING MUSICAL TONES

Masatada Wachi, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Oct. 30, 1978, Ser. No. 955,882
Int. Cl.³ G10H *1/02*; G06F *7/38*
U.S. Cl. 84—1.19 **17 Claims**



1. A process for forming musical tones comprising:

a step of repeatedly generating a first spectrum signal expressing a first frequency spectrum distribution;

a step of repeatedly generating a third spectrum signal by adding a second spectrum signal to said first spectrum signal;

a step of repeatedly generating said second spectrum signal by delaying said third spectrum signal for one repeat cycle and multiplying by a first transfer function on a frequency domain;

a step of repeatedly generating a fourth waveshape signal from said third spectrum signal by the Inverse Fourier Transform operation; and

a step of generating a waveshape and tone having a designated frequency in accordance with said fourth waveshape signal.

4,231,278

ADAPTIVE COMPUTATION IN A DIGITAL TONE SYNTHESIZER

Ralph Deutsch, Sherman Oaks, Calif., assignor to Kawai Musical Instrument Mfg. Co. Ltd., Hamamatsu, Japan

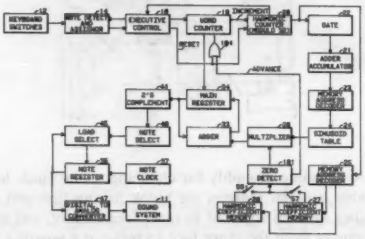
Filed Apr. 25, 1979, Ser. No. 32,980
Int. Cl.³ G10H *1/02*
U.S. Cl. 84—1.19 **12 Claims**

1. In a musical instrument having one or more tone generators in which a plurality of data words corresponding to the amplitudes of a corresponding number of evenly spaced points defining the waveform of one cycle of an audio signal are computed by a Fourier transform using stored values of harmonic coefficients and in which the waveform points are transferred sequentially from a note register to a digital-to-analog converter at a rate proportional to the pitch of the tone being generated the improvement for generating said data words in a time interval whose length is determined by the values of the harmonic coefficients comprising:

a harmonic coefficient memory means for storing values of harmonic coefficients,

memory addressing means for reading out harmonic coefficients from said harmonic coefficient memory,

a computation means using said values of harmonic coefficients wherein said data words are computed during a computation cycle,



a comparator means whereby a comparison signal is generated in response to a preselected value of a harmonic coefficient read out of said harmonic coefficient memory, and

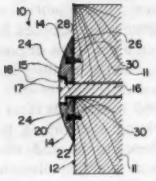
termination means responsive to said comparison signal whereby said harmonic coefficients are inhibited and not provided to said computation means and whereby said computation cycle is terminated thereby causing the duration of said computation cycle to be altered in response to said preselected value of a harmonic coefficient.

4,231,279

ADAPTIVE WASHER AND BOLT ASSEMBLY

Joseph E. Theriot, P.O. Box 766, Houma, La.

Filed Jul. 10, 1978, Ser. No. 922,838
Int. Cl.³ F16B *43/00*
U.S. Cl. 85—9 R **11 Claims**



1. An adaptive washer and bolt assembly comprising:

a. a bolt having a non-circular bolt head portion mounted on a cylindrical bolt shaft;

b. a rounded washer body providing an inner flattened face abuttable against a base structure to which said bolt and said washer body will be attached, said washer body having a rounded outer surface, said outer rounded surface and said inner flattened face intersecting at the outer edge of said rounded washer body to form a peripheral circular edge portion to said washer body;

c. A substantially cylindrical central bore providing an opening through said washer body, said bore having a diameter substantially equal to or larger than the diameter of said bolt shaft; and

d. a non-circular bolt head recess being correspondingly sized to conform to the size of said bolt head, said bolt

head registering with said recess, said recess being provided on said washer body adjacent said curved outer surface and communicating with said central bore, said bolt head recess receivably and protectively housing said bolt head, with the uppermost surface portion of said bolt head being substantially flush with said curved outer surface.

4,231,280

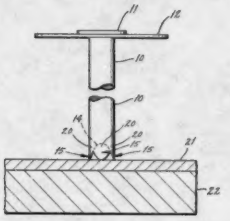
INTERPENETRATING NAILABLE FASTENER FOR SHEET METAL

Jerome A. Gross, 6304 S. Rosebury, St. Louis, Mo. 63105

Filed Mar. 20, 1978, Ser. No. 888,139

Int. Cl.[2] F16B *15/00*

U.S. Cl. 85—31 **2 Claims**



1. A nailable fastener for the spreading interpenetration of sheet metal, comprising:

a metal shank having a driving end portion and an opposite penetrating end portion whose outer surface is generally cylindrical, said opposite end portion being provided with more than two lobes,

each of said lobes having an outer surface which forms part of said generally cylindrical surface, and having a single planar inner camming surface commencing at a level along said shank at which its cylindrical surface portion is uninterrupted and sloping outward away from the driving end portion and forming a partial elliptical intersection with said generally cylindrical outer surface, whereby to provide a cutting edge having a rounded tip cutting edge portion,

said cutting edge being hardened and the lobe portions inward thereof being of greater ductility,

whereby, on backing such sheet metal with a harder metal anvil and driving the fastener therein, the hardened lobe tip portions penetrate the surface of such sheet metal and the lobe camming surfaces bend the ductile lobes outward as their hardened cutting edges slit into and form pockets in the sheet metal within which the bent lobes fit, thereby securing the fastener against withdrawal or tilting.

4,231,281

ADJUSTABLE SPACER-CAM ASSEMBLY

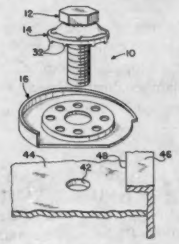
Ernest W. Reinwall, Jr., McHenry, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Jan. 10, 1979, Ser. No. 2,422

Int. Cl.[3] F16B *43/02, 39/26*

U.S. Cl. 85—50 AT **11 Claims**

1. An adjustable spacer-cam assembly comprising in combination a generally disc-shaped cam plate; said plate having an elevated central portion, the upper surface of said central portion having a plurality of drive-receiving means thereon, a flange member extending outwardly from the bottom of the central portion and having a continuously-increasing, upwardly-directed ramp extending about a portion of its outer periphery; said cam plate having an aperture extending through the central portion of the cam; a spring washer member having a central aperture, friction-enhancing means on the upper surface thereof, and a plurality of drive-inducing means on the underneath surface thereof adapted to cooperate with the drive-receiving means of the cam plate; a screw member having a threaded shank portion and a headed portion including surfaces adapted to be engaged by a torque-inducing tool, and friction-increasing means on the underneath surface thereof; said shank portion being adapted to be received in the central apertures of both the spring washer and the cam plate's central portion and further extending into an aperture in a workpiece; whereby as the screw is rotated and advanced into the aperture in the workpiece by said torque-inducing tool, rotational force



is transmitted from the screw to the washer by means of their respective engaged surfaces which have friction-increasing and friction-enhancing means thereon and, correspondingly, from the drive-incuding means of the washer to the cam plate by means of its drive-receiving means; the ramp portion increasing in height in a direction opposite to the direction of rotation such that, as the cam is rotated, the ramp portion will adjustably occupy a variable amount of space between the workpiece and another element attached thereto.

4,231,282

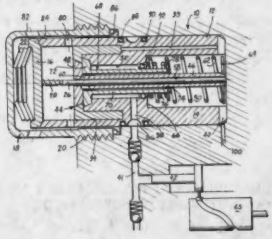
IGNITION SYSTEM

Eugene Ashley, Burlington, Vt., assignor to General Electric Company, Burlington, Vt.

Filed Mar. 29, 1979, Ser. No. 25,176

Int. Cl.[3] F41F *1/04*

U.S. Cl. 89—7 **7 Claims**



1. An ignition system for liquid propellant comprising:

a first chamber;

a piston having a head disposed in said first chamber and dividing said first chamber into an ignition chamber and a liquid propellant supply chamber;

means for admitting gas into said ignition chamber;

unidirectional flow valve means for admitting liquid into said supply chamber and for blocking loss of liquid therefrom;

means for providing under pressure a predetermined quantity of liquid propellant through said unidirectional flow valve means into said supply chamber, whereby said liquid propellant causes translation of said head of said piston in a first direction to enlarge the volume of said supply chamber and to decrease the volume of said ignition chamber, to compress and thereby heat the gas;

first means effective upon the translation of said head to a predetermined minimal volume of said ignition chamber for passing an initial quantity of liquid propellant from said supply chamber into said ignition chamber for ignition by the therein compressed and heated gas, whereby the ignited liquid propellant provides an increase in gas pressure in said ignition chamber and causes translation of said head of said piston in a second direction opposite to said first direction to enlarge the volume of said ignitior. chamber and to decrease the volume of said supply chamber; and

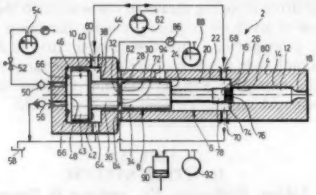
second means effective upon the translation of said head in said second direction to progressively pass the remaining quantity of liquid propellant from said supply chamber to said ignition chamber during the course of movement in said second direction of said head.

4,231,283

PULSATING LIQUID JET GUN AND METHOD OF OPERATING THE SAME

Werner Malburg, Ottobrunn, Fed. Rep. of Germany, assignor to Messerschmitt-Bölkow-Blohm Gesellschaft mit beschränkter Haftung, Fed. Rep. of Germany

Filed Nov. 1, 1978, Ser. No. 956,804
Int. Cl.[3] B05B *1/08, 3/14*
U.S. Cl. 89—8 **25 Claims**



1. A pulsating liquid jet gun, comprising, a cylinder having a cylinder bore with a combustion space for periodically receiving a propellant charge and a bore portion defining a liquid chamber, a free piston movable in said cylinder bore between said combustion space and said liquid chamber, means for generating hot reaction gases by ignition of said propellant charge periodically in said combustion space, means for filling liquid into said liquid chamber prior to every ignition of said propellant charge, said means for generating hot reaction gases for causing ignition of the propellant charge being by an adiabatic compression thereof thermally initiating the ignition.

4,231,284

LOAD EQUILIZATION FEEDBACK FOR PARALLEL CHANNEL SERVO ACTUATORS

Alan C. Smith, Newhall, and Manfred A. Runkel, Valencia, both of Calif., assignors to Textron, Inc., Providence, R.I.

Filed Aug. 31, 1978, Ser. No. 938,578
Int. Cl.[3] F01B *25/04;* **F15B** *11/22, 13/16*
U.S. Cl. 91—171 **2 Claims**

1. Mechanical feedback apparatus having load synchronization in a parallel pair force transmission system comprising:

(A) a pair of actuators each having a housing including a cylinder, a piston and a piston rod;

(B) means connecting said cylinders rigidly together in side by side relationship with said piston rods extending from said cylinders in the same direction;

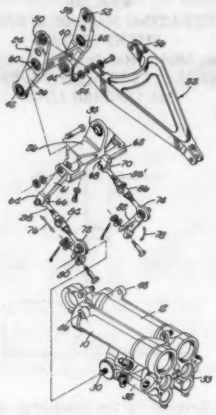
(C) means connecting said piston rods rigidly together at one end thereof outside said cylinders;

(D) a separate control valve means for each of said actuators and formed as a part of the housing for its respective actuator for controlling the application of fluid under pressure from a source thereof to said actuators to cause relative movement between said pistons and their respective cylinders;

(E) means anchoring one of said cylinders and said piston rods;

(F) means connected between the other of said cylinders and piston rods and said control valve means including:

1 a rigid feedback member having a pair of diverging arms,



2 a summing link having a pair of spaced apart legs interconnected with a flexible web so that said link is flexible in torsion, said arms being connected to said legs,

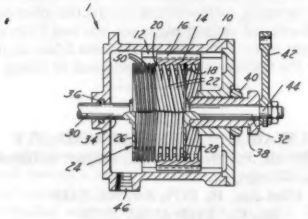
whereby differential lateral motion between said pistons and cylinders is detected by said feedback members and is applied to said control valve means through said link for counteracting said differential lateral motion.

4,231,285

VARIABLE RATE ANEROID CAPSULE

Michael M. Schechter, Southfield, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 7, 1978, Ser. No. 967,531
Int. Cl.[3] F01B *19/00;* **F16J** *3/04*
U.S. Cl. 92—34 **7 Claims**



1. A variable rate aneroid capsule comprising a sealed bellows having a plurality of axially expandable and contractible convolutions defining a predetermined spring rate to the bellows providing a stroke varying as a linear function of the change in differential pressure level acting on the convolutions, the convolutions being helically formed to define an externally threaded helical surface, means to prevent expansion or contraction in either direction of certain ones of the total convolutions to vary the bellows spring rate and thereby provide a different linear stroke of the bellows for the same differential pressure level acting on the convolutions, said

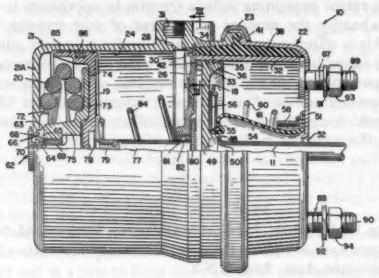
means to prevent expansion or contraction comprising an element having an internally threaded surface mounted for mating engagement with selected ones of the external surfaces of the convolutions, and means providing relative rotation between the bellows and external surface for progressively threading convolutions of the bellows into engagement with the external surface.

4,231,286

BRAKE ACTUATORS

Sergio Campanini, Iola, Kans., assignor to The Echlin Manufacturing Company, Branford, Conn.

Filed Jun. 13, 1979, Ser. No. 48,067
Int. Cl.[3] F01B 7/00
U.S. Cl. 92—64 **22 Claims**



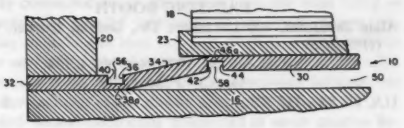
10. In an actuator for use in a vehicle having a braking system including a fluid pressure source valve means coupled to said source for developing a service pressure of variable magnitude and a brake assembly having a control element movable through a certain distance between a rearward inactive position and a forward limit position at which maximum braking force is applied to the vehicle, said actuator comprising housing means defining a rearward end wall, an intermediate partition wall and a forward end wall and rearward and forward coaxial internal cylindrical surfaces around rearward and forward spaces between said rearward and forward end walls and said partition wall, auxiliary and service pistons in said spaces on opposite sides of said partition wall, peripheral seal means on said pistons in slidable engagement with said internal cylindrical surfaces, an elongated rod for extending forwardly from said housing along the axis of said cylindrical surfaces and to a forward end connectable to said control element, first force transmitting means between said auxiliary piston and said rod, second force transmitting means between said service piston and said rod, a coiled compression spring having a forward end acting against the rearward side of said auxiliary piston means for admitting fluid under source pressure into said housing to act against the forward side of said auxiliary piston to move said auxiliary piston rearwardly and compress said spring, said spring being operative upon removal of said source pressure to act through said first force transmission means and said rod to move said control element forwardly from said rearward inactive position to said forward limit position, and means for admitting fluid under service pressure into said housing to act against the rearward side of said service piston and to act through said second force transmission means and said rod to effect movement of said control element forwardly from said rearward inactive position to said forward limit position with the force applied to said control element being uniformly proportionate to the magnitude of said service pressure throughout said movement, said service piston being in front of said partition wall and said auxiliary piston being behind said partition wall.

4,231,287

SPRING DIAPHRAGM

Parker C. Smiley, Oakland, Calif., assignor to Physics International Company, San Leandro, Calif.

Filed May 1, 1978, Ser. No. 901,622
Int. Cl.[3] F01B 19/00; F16J 3/00
U.S. Cl. 92—94 **12 Claims**



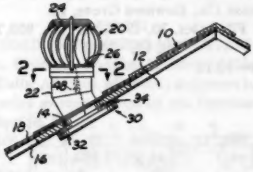
1. A high pressure diaphragm comprising
a generally planar central member having an outer edge, a low pressure side and a high pressure side,
a generally planar outer flange-engaging member having an inner edge, a low pressure side and a high pressure side,
a rigid, generally planar annular ring member having an outer edge, an inner edge, a low pressure side and a high pressure side,
a first means for flexibly connecting said outer edge of said annular ring member to said inner edge of said flange-engaging member, comprising
a first bridge member having a thickness less than the thickness of said annular ring member and fabricated integrally with said annular ring and said flange-engaging member,
a second means for flexibly connecting said inner edge of said annular ring member to said outer edge of said central member comprising
a second bridge member having a thickness less than the thickness of said annular ring member and fabricated integrally with said annular ring member and said central member, and,
an electroexpansive member located proximate said low pressure side of said central member and adapted to exert force thereon when said electroexpansive member is in its expanded position, and
means for maintaining said electroexpansive member at all times under compression.

4,231,288

ROOF VENTILATING APERTURE SEAL

Billy L. Finley, 1016 NW. 21, Moore, Okla. 73160

Filed Apr. 13, 1979, Ser. No. 29,794
Int. Cl.[3] F24F 7/02
U.S. Cl. 98—43 R **1 Claim**



1. In combination with a wind driven turbine attic ventilator overlying a roof having an inner surface and having a ventilating aperture, the improvement comprising:
a generally flat disk underlying the roof in surrounding relation with respect to the aperture therein for closing said aperture,
said disk having a pair of concentric flanges adjacent its periphery forming a substantially U-shaped groove open toward the inner surface of said roof;
a seal formed from resilient material coextensive with the

groove and projecting beyond said flanges for sealing with the inner surface of said roof; and,

a resilient member extending between and connecting said disk with a peripheral portion of said attic ventilator in a manner to prevent the normal angular rotation of said turbine.

4,231,289

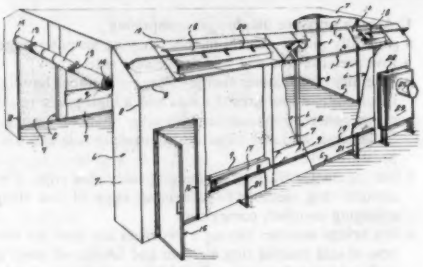
PAINTING BOOTH

Alain Domicent, 800 Lakeshore Dr., Dorval, Quebec, Canada (H9S 2C6)

Filed Jan. 26, 1979, Ser. No. 6,734

Int. Cl.³ F23J *11/12*

U.S. Cl. 98—115 SB **8 Claims**



1. A painting booth comprising a framework forming a booth skeleton, a booth including a roof, walls and an access door, the major portion of said roof, walls and access door consisting of an air filtering pervious skin, fixed to, and supported by, said framework and operatively confining a closed booth space, paint spraying equipment located within said booth space for spraying paint on an article to be painted and also located within said space, and an air purifying and blower unit including a casing fixed to said framework, extending through an opening made in said skin and peripherally sealed to the latter, said casing having an inlet opening communicating with said booth space and an outlet opening communicating with the exterior of said booth enclosure, an air filter extending across said inlet opening and an air blower mounted in said casing exteriorly of said air filter, said air blower sucking air into said booth space through said air filtering pervious skin, and expelling air out of the booth space through said air filter.

4,231,290

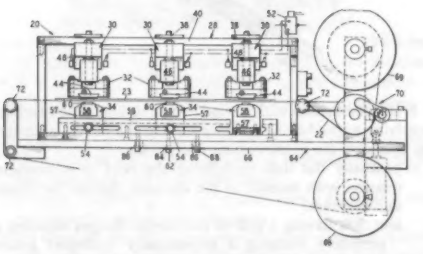
MULTIPLE HEAD MARKING DEVICE

James L. Shenoha, Lockport, Ill., assignor to Norwood Marking & Equipment Co., Downers Grove, Ill.

Filed Oct. 30, 1978, Ser. No. 955,706

Int. Cl.³ B41J *1/08*

U.S. Cl. 101—93.11 **7 Claims**



1. A multiple imprinting apparatus for simultaneously marking a plurality of discrete marking areas on a surface to be marked, said marking areas being spaced apart transversely of a line of travel of the surface to be marked, comprising an imprint marking assembly having a frame member mounted in juxtaposition to the surface to be marked, a plurality of transversely spaced marker head members adjustably carried on said frame member for positioning said marker head members in registration with said discrete marking areas, said marking areas being variable in size and spacing when changing the surface to be marked, each marker head member includes an individually powered striker member, movable towards and away from the marking areas, a transfer tape assembly including a transfer tape, carried by said frame member, means to adjust said transfer tape assembly to angularly position a span of the transfer tape relative to the transversely spaced marker head members for movement therealong, said span having a longitudinal length and a width, the marker head members having raised imprinting indicia thereon in opposition to said tape whereby the angular adjustment of said transfer tape assembly is effective to position said transfer tape span relative to said raised indicia whereby each raised indicia contacts the tape span to imprint the discrete marking areas when striker members are activated, in a discrete longitudinal area of the tape, said longitudinal areas being offset from one another across the width of the tape and non-overlapping.

4,231,291

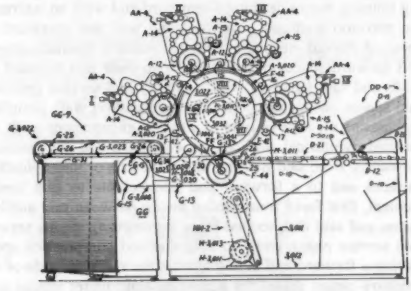
PRINTING PRESS

William W. Davidson, Jr., Port Washington, Long Island, N.Y., assignor to North Shore Precision Research Corporation, Port Washington, Long Island, N.Y.

Division of Ser. No. 498,844, Aug. 19, 1974, Pat. No. 4,098,185, which is a division of Ser. No. 235,221, Mar. 16, 1972, Pat. No. 3,848,320, which is a continuation-in-part of Ser. No. 73,161, Sep. 17, 1970, abandoned, which is a continuation-in-part of Ser. No. 658,385, Aug. 4, 1967, abandoned. This application Jan. 3, 1978, Ser. No. 866,778

Int. Cl.³ B41F *7/08, 31/30;* **B65H** *3/10, 7/12*

U.S. Cl. 101—137 **16 Claims**



1. A sheet-fed printing press comprising a large printing cylinder and a lower printing cylinder mounted in a frame structure in rotational, tangential relationship, with said large printing cylinder above said lower printing cylinder to form a printing couple with a printing bite therebetween, said large printing cylinder having an effective diameter which is an integer multiple, greater than one, of the effective diameter of said lower printing cylinder, a single work area on the periphery of said lower printing cylinder, the periphery of said large-printing cylinder being divided into a plurality of substantially equal work areas, means for automatically feeding a sheet of paper once for every revolution of said lower printing cylinder in timed relationship with the rotation of said lower printing cylinder, from a supply of sheets on one side of the vertical plane containing the axis of said lower printing cylinder, to and

through the bite of said printing couple to delivery means on the other side of said plane, including a paper support plate adjacent said lower printing cylinder over which said sheets pass, an intermittently driven lower feed roller rotatably mounted on a fixed center with the upper surface thereof projecting through an opening in said paper support plate and approximately tangent to the face thereof, an upper feed roller which is free to turn about a shaft which is mounted in a frame which intermittently rocks to bring said upper feed roller to contact with said lower feed roller and to lift it out of contact therewith, a plurality of stop fingers closer to said lower printing cylinder and projecting upwardly through other openings in said paper support plate, said stop fingers being pivotably mounted to move up into a fixed position in the path of said sheets and to rock forward and down out of the path of said sheets, cylinder register stops carried by said lower printing cylinder and cylinder gripper fingers which work in cooperation with said cylinder register stops and which open to allow the leading edge of a sheet to be brought into register with said cylinder stops and then close to hold the leading edge of the sheet in said registered position, means including a plurality of cams mounted to rotate with said lower printing cylinder which act to cause said lower feed roller to be stationary, said upper feed roller in said lifted position and said stop fingers in said up position at the time in the cycle when the leading edge of a sheet fed by said feeding means passes over said paper support plate and stops in contact with said upwardly projecting stop fingers, said rotatable cam means then acting to cause said upper feed roller to descend to hold the sheet against said lower feed roller to then rock said stop fingers forward and down out of the path to be followed by the leading edge of the sheet and at a rate to keep them ahead of said leading edge, to then start to rotate said lower feed roller in a direction to cause it to advance said leading edge at an accelerating rate to bring said leading edge to the periphery of said lower printing cylinder as said cylinder register stops and said cylinder gripper fingers pass the position of the surface of said paper support plate and then at a greater accelerating rate to bring said leading edge into register contact with said cylinder register stops and then at a rate to hold said leading edge in said registered position, and stationary cam means associated with said lower printing cylinder which cause said cylinder grippers to open as said lower printing cylinder rotates and they approach the position of said paper support plate and to hold them in said open position as they pass the position of said support plate and as said leading edge of said sheet moves beyond the edge of said paper support plate and into the grippers, to cause them to start to close as said leading edge moves into register contact with said cylinder register stops, and to close to grip said leading edge as it is held in register contact with said cylinder stops, said rotating cam means then causing said upper feed roll to lift to release the sheet, said lower feed roller to cease turning and come to rest and said stop fingers to remain below the surface of said paper support plate until just before the time in the cycle when the leading edge of a following sheet will reach the position of the stop fingers, whereby the leading edge of each sheet is carried to and through the bite of the printing couple held securely in registered position against the cylinder register stops.

4,231,292

SAFETY INTERLOCK FOR OFFSET PRINTING PRESS

James R. Stolle, Whitinsville, Mass., assignor to White Consolidated Industries, Inc., Cleveland, Ohio

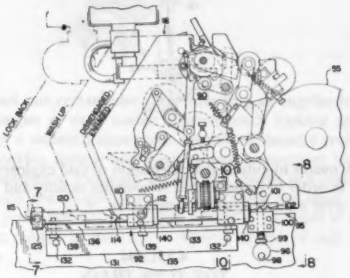
Filed Aug. 25, 1978, Ser. No. 936,823
Int. Cl.³ B41F *7/08, 13/28, 31/30, 7/40*
U.S. Cl. 101—137 **3 Claims**

1. In an offset printing press having a mainframe, a printer head fixed to the mainframe, the printer head including a blanket cylinder and a plate cylinder, the plate cylinder and the blanket cylinder being rotatably supported by the printer head, the plate cylinder being movable into and out of an engagement position with the blanket cylinder wherein the plate cylinder is rotatably driven by a drive means at said engagement position, and a carriage mounted on the mainframe and linearly movable to and from the plate cylinder, the carriage including dampening and inking rollers, a safety interlock system for electrically deenergizing a motor mounted on the mainframe and driving the drive means, comprising:

a pair of power lines across which the press motor is connected for electrical energization;

a relay connected across the power lines, the relay being in electrically parallel relation with the press motor, the relay including at least one pair of relay contacts which are normally open when the relay is deenergized, the relay contacts being electrically series-interposed between the motor and one of the power lines; and

a switch means electrically connected in series relation between the relay and one of the power lines, the switch



means being responsive both to carriage movement to and from the printer head over a predetermined distance and to the plate cylinder movement into and out of its engagement position, wherein movement of the carriage away from the printer head for the predetermined distance, when the plate cylinder is in its engagement position, opens the switch means to deenergize the relay and electrically open the pair of relay contacts wherein the motor is electrically disconnected from one of the power lines, movement of the plate cylinder out of its engagement position closing the switch means and reenergizing the relay to electrically close the pair of relay contacts wherein the motor is reconnected to the power lines when the carriage is at the predetermined distance from the printer head.

4,231,293

SUBMISSILE DISPOSAL SYSTEM

C. James Dahn, Chicago; Douglas R. Morita, Morton Grove, and Allen J. Tulis, Addison, all of Ill., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 26, 1977, Ser. No. 847,468
Int. Cl.³ F42B *25/16*
U.S. Cl. 102—7.2 **2 Claims**

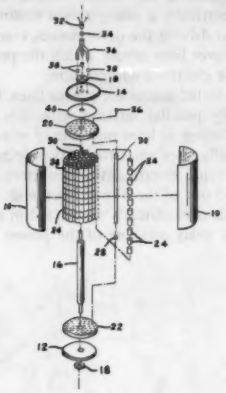
1. A system for effecting the rapid and uniform dispersal of submissiles from a compact container, said system comprising

A. a cylindrical container of frangible material having a support rod coaxially positioned therewithin;

B. a multiplicity of abutting cylindrically shaped submissiles oriented parallel to the longitudinal axis of said container and positioned around said support rod to substantially fill said container;

C. A multiplicity of cylindrical explosive charges interstitially located with respect to said submissiles to provide a hex-packed arrangement of said submissiles with respect

to said support rod and said explosive charges with respect to said support rod; and



D. means to initiate the detonation of said explosive charges in order to disperse said submissiles rapidly and uniformly over a predesignated target area.

4,231,294

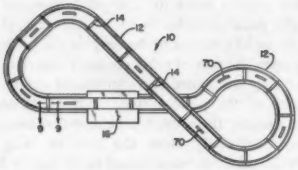
TOY TUBE TRAIN

Philippe Arzoumanian, 160 Eaton St., Providence, R.I. 02908

Filed May 21, 1979, Ser. No. 41,009

Int. Cl.³ B61B *13/10*

U.S. Cl. 104—138 R **10 Claims**



1. A high speed toy train comprising a plurality of detachably connectible track sections each having an elongated base, a pair of spaced parallel track rails mounted on said base, means mounted on said base between said track rails for supplying electrical current to a toy train on said rails, means to confine the train and prevent derailment at high speeds comprising a transparent cover for said base, coacting means on said base and cover for mounting said cover to said base, and a toy train for operating on said rails, said train having means for contacting said electrical supply means between said track rails.

4,231,295

TRAFFIC SYSTEM FOR TRACK-TIED VEHICLES WITH STEERABLE AXLE

Hans-Joachim Förster, Stuttgart, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

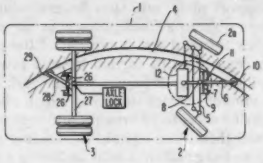
Filed Jun. 20, 1977, Ser. No. 808,367

Claims priority, application Fed. Rep. of Germany, Jun. 23, 1976, 2628217

Int. Cl.² E01B *25/28*

U.S. Cl. 104—245 **40 Claims**

1. A traffic system for track-guided vehicles which includes at least one vehicle axle having axle means connected with steerable wheels, the traffic system comprising a road-associated guide means for defining a drive track, a guide lever means arranged on the vehicle for detecting a course of the guide means, and further means for transmitting movements of the guide lever means indirectly to the steerable wheels including an auxiliary energy assisted force and movement transmission means, characterized in that the guide lever means is pivotally connected to the axle means, means are provided for limiting a pivotal deflection of the guide lever means over a relatively small angular path corresponding only to a fraction of a maximum deflection angle of the steerable wheels, the means for transmitting movements of the guide lever means



includes means for defining a force-flow transmission path of the guide lever means between the guide means and the axle means and for enabling the vehicle to be track-guided along the guide means in a damage-free and operationally reliable manner without a deflection of the steerable wheels and in that a track directional detection means is provided for detecting at least approximately the direction of the guide means relative to a longitudinal axis of the vehicle including a detection lever means pivotally connected at a free end of the guide lever means.

4,231,296

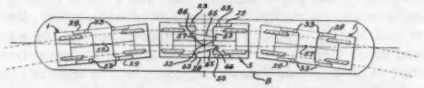
THREE-TRUCK HIGH ADHESION LOCOMOTIVE

Keith L. Jackson, Granite City, Ill., assignor to General Steel Industries, Inc., St. Louis, Mo.

Filed Jun. 2, 1978, Ser. No. 911,985

Int. Cl.² B61C *3/00*; B61F *3/06, 5/08, 5/16*

U.S. Cl. 105—136 **21 Claims**



1. In a railway locomotive, at least three load bearing trucks spaced apart lengthwise of the locomotive and comprising a pair of end trucks and at least one intermediate truck, each of said trucks having a pair of longitudinally spaced-apart wheeled axles, a truck frame resiliently supported on said axles, each of said end trucks having a bolster resiliently supported on its frame for vertical and transverse cushioning movements with respect thereto, said intermediate truck having bolster structure resiliently supported on its frame for vertical and transverse movements with respect thereto, each of said end trucks having a traction transmitting connection between its frame and its bolster, said intermediate truck having a traction transmitting connection between its frame and its bolster structure, all of said traction transmitting connections being effective substantially at rail level, elongated underframe structure, means supporting said underframe structure on said bolsters and said bolster structure and preventing longitudinal tiling of said bolsters and bolster structure relative to said underframe structure, said underframe structure and the bolsters of each of said end trucks having fixed cooperating vertical axis swivel bearings accommodating solely relative swiveling movements of said end truck bolsters with respect to said underframe structure, and transversely yieldable longitudinally unyielding means connecting said intermediate truck bolster structure and said underframe structure for transmitting longitudinal forces

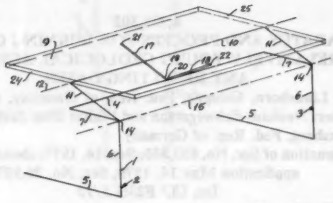
from said intermediate truck bolster structure to said underframe structure and accommodating substantial lateral excursions of said intermediate truck bolster structure with respect to said underframe structure as may be required for operation of the locomotive on curved track, said swivel bearings and said connecting means cooperating with said underframe structure supporting means and said traction transmitting connections to maintain the effective level of traction transmission from said trucks to said underframe structure substantially at rail level whereby to minimize axle-to-axle load transference in each of said trucks while minimizing development of lateral components of traction forces in any of said traction transmitting connections.

4,231,297

TABLE HAVING AN ADJUSTABLE SUPPORT AND LOCKING SYSTEM FOR THE TOP THEREOF

Gert A. E. Holbek, Holte, Denmark, assignor to Erik Munch, Denmark

Continuation of Ser. No. 880,059, Feb. 22, 1978, abandoned.
This application Feb. 13, 1979, Ser. No. 11,911
Claims priority, application Denmark, Feb. 23, 1977, 785/77
Int. Cl.³ A47F *5/12*
U.S. Cl. 108—10 **10 Claims**



1. Table, comprising a table top which is adjustable both as regards the height and the slope of the table top, characterized by a rigid U-shaped member, the branches of which are pivotally connected to a subframe of the table about a horizontal axis, and the intermediate part of which is pivotally connected to the table top about an axis extending parallel with the pivot axis of the branches; a first telescopically extensible rod, the lengths of which is adjustable from a predetermined initial length which corresponds to the distance between the pivot axis of the branches and the pivot axis of the intermediate part of the U-shaped member, one end of the first rod being pivotally connected with the subframe of the table at a distance from the pivot axis of the branches, the other end of said first rod being pivotally connected with the table top at a distance from the pivot axis of the intermediate part, which distance corresponds to the distance between said one end of said first rod and the pivot axis of the branches; a second telescopically extensible rod, one end of which is pivotally connected with the subframe and the other end of which is pivotally connected with the table top at a distance, as seen in direction perpendicular to the pivot axis of the intermediate part, from said other end of said first rod, the pivot connections of said other rod being selected so that said other rod forms an angle different from nil together with the plane defined by the pivot axis of the branches and the pivot axis of the intermediate part.

4,231,298

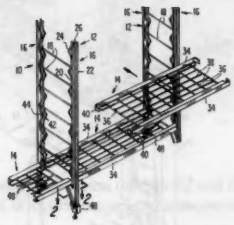
SHELVING SYSTEM

Hyman Pollack, 41 Stonicker Dr., Lawrenceville, N.J. 08648

Filed Mar. 21, 1979, Ser. No. 22,582
Int. Cl.³ A47B *57/06*
U.S. Cl. 108—64 **10 Claims**

1. A shelving system comprising

(a) at least two uprights each of which includes a pair of post assemblies at opposite sides thereof and vertically spaced cross braces extending between and joined to the post assemblies, the several post assemblies being disposed at rectangularly spaced corners of said system, each corner post assembly comprising at least one outer and one inner post element spaced closely from each other and relatively formed to define between them a plurality of side locking spaces occurring at each of said corners at selected, vertically spaced intervals along the length of the elements of the post assembly provided at said corner; and



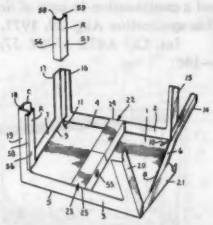
(b) at least one rectangular shelf including an angular locking tongue at each corner thereof, each locking space having a widened upper part adapted to loosely receive said locking tongue and merging into a narrower lower part adapted to lockingly engage said tongue in a position in which the tongue is confined between the inner and outer post elements of the post assembly provided at said corner, and is in embracing relation to one of said elements.

4,231,299

MERCHANDISING DISPLAY

James L. Gebhardt, Roswell, and Ferris L. Hutchins, Jr., Doraville, both of Ga., assignors to The Mead Corporation, Dayton, Ohio

Filed Jun. 15, 1979, Ser. No. 49,189
Int. Cl.³ A47B *7/00*
U.S. Cl. 108—91 **9 Claims**



1. A merchandising display comprising a top with legs disposed respectively at each corner thereof and extending downwardly therefrom, and characterized in that each of said legs comprises a pair of elongated V-shaped support elements arranged with the apexes of said V-shaped support elements of each pair in close juxtaposition and an elongated retention clip arranged to envelope and interlock each pair of said V-shaped support elements.

4,231,300

SHELF BRACKET ASSEMBLY

John S. Shepard, 1304 S. Shields, Ft. Collins, Colo. 80521

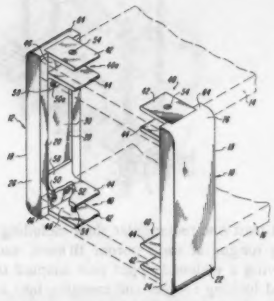
Filed Sep. 4, 1979, Ser. No. 72,351
Int. Cl.³ A47B *3/00*
U.S. Cl. 108—111 **12 Claims**

1. An assembly including a shelf bracket for constructing shelving from spaced elongated shelf boards of standard thickness, comprising:

an elongated leg of generally rectangular lateral cross section having space-opposed major surfaces joined by space-opposed minor surfaces;

means defining a longitudinal groove in one of said major surfaces, said groove being of predetermined width and predetermined depth;

a pair of U-shaped clips each having a pair of plates joined by a flat bight with said plates being parallel-spaced apart a distance substantially equal to said standard thickness for



snug engagement with the marginal edge portion of a shelf board, with said bight having a width no greater than and substantially the same as said predetermined width to seat tightly in said groove, and with said bight having a thickness no greater than said predetermined depth;

and means for securing said clips individually in respective different mutually spaced portions of said groove with said bight seated therein and said plates oriented transversely with respect to said leg.

4,231,301

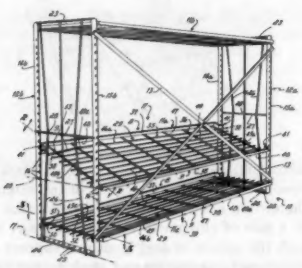
ADJUSTABLE SHELF ASSEMBLY

Wade H. Barrineau, III, 5159 E. Shore Dr., Conyers, Ga. 30207

Continuation-in-part of Ser. No. 628,133, Nov. 3, 1975, abandoned, and a continuation-in-part of Ser. No. 737,401, Nov. 1, 1976. This application Aug. 29, 1977, Ser. No. 783,568

Int. Cl.[2] A47B *57/04, 57/20*

U.S. Cl. 108—146 **1 Claim**



1. A shelf assembly comprising

a front corner post having a plurality of holes along the length thereof,

a shelf adapted to be positioned in a horizontal attitude, said shelf having a front edge and a rear edge,

said shelf comprising a grid formed from a plurality of transverse members and a plurality of longitudinal members connected to said transverse members,

latch structure connected with said shelf adjacent said front corner post, said latch structure comprising a flex arm connected at one end to said shelf and formed by one of said longitudinal members which has an end not connected to an outermost transverse member and hence is free to flex in the plane of said shelf, and a latch finger forming an extension of said flex arm and extending perpendicularly to the free end thereof, said flex arm being disposed generally parallel to the front edge of said shelf in a connect position at which said latch finger is received in said corner post hole, and said latch finger being retracted from that corner post hole in response to a force exerted on said flex arm in a direction generally normal to the front edge of said shelf, thereby permitting said shelf to be easily assembled with or disassembled from said front corner post by exerting manually a force on said flex arm in said generally normal force direction,

a portion of said longitudinal members establishing a hand grip which can be manually engaged by one of the fingers and thumb of an installer's hand,

one of said longitudinal support members comprising a front band of substantial vertical rigidity, said flex arm being formed integral with one of said longitudinal support members other than said front band, said latch finger passing through a dog leg at the corner of said shelf formed from said front band, thereby providing vertical force stability to said latch finger.

4,231,302

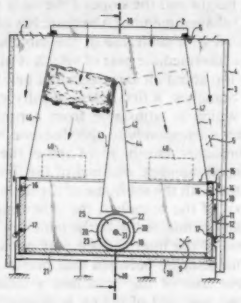
APPARATUS AND PROCESS FOR BURNING OF FUELS OF RELATIVELY YOUNG GEOLOGICAL AGE AND OF ANY RESULTING GASES

Hans Linneborn, Cologne, Fed. Rep. of Germany, assignor to Albert Neuhaus-Schwermann and Walter Otto Zerbin, both of Arnsberg, Fed. Rep. of Germany

Continuation of Ser. No. 833,333, Sep. 14, 1977, abandoned. This application May 14, 1979, Ser. No. 38,927

Int. Cl.[3] F23G *5/12*

U.S. Cl. 110—229 **14 Claims**



1. A heating assembly for burning fuel of organic origin, comprising, in combination:

a substantially enclosed hollow assembly including a predetermined region within said assembly for receiving the fuel for ignition purposes;

first oxygen supply means for supplying said predetermined region with oxygen at least at a rate adequate for producing a gas flow of distilled-off gases, air gases and combustion gases from the ignited fuel;

an elongated outer shell disposed within said predetermined region and having a plurality of passages for dividing said gas flow into a plurality of streamlets;

an elongated inner shell, having an inlet and an outlet, disposed within said outer shell and defining a space between said inner and outer shells, said space communicating with said inlet, said streamlets being recombined into a gas stream in said space;

second oxygen supply means for supplying said inner shell

with oxygen near its inlet for burning said stream of gas; and

an exhaust conduit communicating with said outlet for exhausting said burnt stream from said heating assembly, whereby said stream of gas remains in said heating assembly for a predetermined dwelling time, said predetermined dwelling time being substantially proportional to the sum of the lengths of said inner and outer shells.

4,231,303

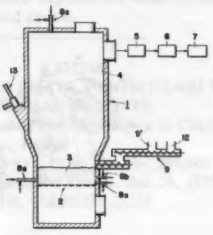
METHOD FOR INCINERATION OF ORGANIC CHLORINE COMPOUND AND INCINERATOR USED THEREFOR

Masayoshi Fujiu, Fujisawa, and Tetsuo Hida, Yokohama, both of Japan, assignors to Showa Denki K.K., Tokyo, Japan

Filed Oct. 31, 1978, Ser. No. 956,364

Int. Cl.³ F23G 5/00

U.S. Cl. 110—245 **10 Claims**



1. A method for the fluidized-solids incineration of an organic chlorine compound, which method comprises:

causing particles of an inert medium to be fluidized so as to form a fluidized bed,

controlling the composition of said bed so that the particles of the inert medium for the fluidized bed contain SiO_2 and Al_2O_3 in a combined concentration of at least 95% by weight and Na_2O and K_2O in a combined concentration of not more than 1.0% by weight,

causing the organic chlorine compound to be admixed into the fluidized bed in conjunction with water or an aqueous solution and simultaneously subjecting the compound to combustion,

and consequently giving rise to an exhaust gas having an extremely low chlorine gas content.

4,231,304

COMBUSTION APPARATUS UTILIZING AN AUGER HAVING AN INTEGRAL AIR SUPPLY SYSTEM

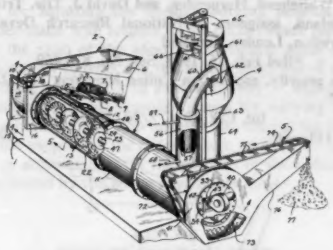
Gordon H. Hoskinson, Jacksonville, Fla., assignor to Cornell-Hoskinson Manufacturing Corp., Brooklyn, N.Y.

Filed Apr. 30, 1975, Ser. No. 573,269

Int. Cl.³ F23G 5/00

U.S. Cl. 110—257 **21 Claims**

19. A screw conveyor means for moving debris through an elongate combustion chamber while delivering air for combustion of the debris and comprising an elongate hollow shaft means mounted for rotation and penetrated by longitudinally spaced apart air flow openings, drive means for rotating said shaft means, thread means spiraled about said shaft means for engaging debris upon rotation of said shaft means and thereby for moving engaged debris, and fan means operatively communicating with said shaft means for impelling air flow therethrough, said thread means defining a hollow interior operatively communicating with said shaft means for receiving air flow impelled therethrough and for directing air to impinge onto debris engaged by said thread means and cooperating with said shaft means and said fan means for distributing air



flowing through said shaft means therealong and thereby facilitating combustion of debris moved by said conveyor means.

4,231,305

SOIL CULTIVATING MACHINE

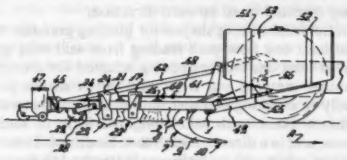
Cornelis van der Lely, 7, Brüschenrain, Zug, Switzerland

Filed Aug. 8, 1978, Ser. No. 931,998

Claims priority, application Netherlands, Aug. 15, 1977, 7708957

Int. Cl.³ A01C 5/00, 5/08

U.S. Cl. 111—7 **11 Claims**



1. A soil cultivating machine comprising a frame and soil penetrating tools being supported on the frame, spraying means mounted on said frame and positioned to the rear of said tools, a plurality of soil cultivating rollers journalled on the frame and at least one of said rollers comprising soil penetrating means, said one roller being located behind said spraying means, whereby material can be sprayed in advance of the roller and mixed into the soil with vegetation cut by the soil penetrating means, said spraying means comprising spaced apart spraying booms with valve means and said booms being operatable independently of one another, one spraying boom with rearwardly directed spraying nozzles being located in advance of said roller and seed drills being mounted behind that roller, said roller having a plurality of support plates and a periphery of elongate members, each tool being a tine pivotably connected to the frame adjacent the end of a substantially rectangular upper portion of the tine, a shear pin interconnecting said upper portion to the frame to prevent pivotal movement of the tine during normal operation, and said upper portion extending upwardly and forwardly at about 45° to the vertical.

4,231,306

APPARATUS FOR INJECTING GRANULAR MATERIAL IN SOIL

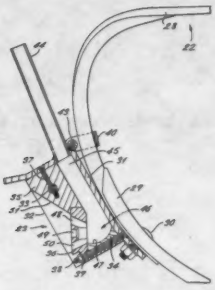
Alan G. Whitehead, Harpenden, and David J. Tite, Tring, both of England, assignors to National Research Development Corporation, London, England

Filed Feb. 16, 1978, Ser. No. 878,469

Claims priority, application United Kingdom, Feb. 23, 1977, 07620/77

Int. Cl.³ A01C *7/20, 15/04*

U.S. Cl. 111—86 **19 Claims**



1. Apparatus for injecting granular material in soil comprising:

an outlet means having an elongated form for securing to the rear of a tine adapted for opening a vertical slit in the soil when dragged through the soil, the said outlet means being for securing to the rear of such a tine with the elongated form of the outlet means aligned generally along the length of the tine;

said outlet means defining an inlet opening for connection to a conduit for delivering granular material under air pressure to said outlet means, and said outlet means defining at least one outlet opening adapted to direct granular material out from said outlet means at least one said opening being oriented in an upward direction;

said outlet means being shaped for guiding granular material in at least one flow path leading from said inlet opening, said at least one outlet opening adapted for directing the granular material out from said outlet means predominantly in an elongated distribution aligned generally in a common plane with said elongated form of said outlet means, and in a direction such as to be directed rearwardly of a tine when said outlet means is attached to the tine, said distribution including an upwardly directed component and each said outlet means including a swirl chamber operative to forcibly randomise the granular material immediately prior to its exit through said at least one outlet opening.

4,231,307

PULSE GENERATOR FOR SEWING MACHINES

Hideaki Takenoya, Hachioji, Japan, assignor to Janome Sewing Machine Co., Ltd., Tokyo, Japan

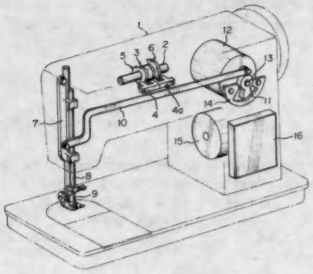
Filed Oct. 4, 1978, Ser. No. 948,321

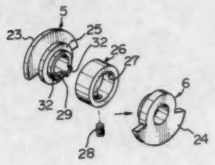
Claims priority, application Japan, Oct. 4, 1977, 52-132858[U]

Int. Cl.² D05B *3/02*

U.S. Cl. 112—158 E **6 Claims**

1. In a sewing machine which comprises a machine housing, a main shaft rotatably mounted on the machine housing, a needle bar swingably mounted and vertically reciprocated by the main shaft, a feeding device operated in timed relation with the needle bar, first electrically operated means for controlling the lateral movement of the needle bar, and second electrically operated means for controlling the movement of the feeding device, a pulse-generating system operative for generating in synchronism with rotation of the main shaft pulses controlling the operation of the first and second electrically operated means, the pulse-generating system comprising two rotational parts, two pulse-generating devices, each pulse-generating device sensing the presence and absence of a respective one of





the two rotational parts and generating pulses in correspondence thereto, each rotational part having an axial extension, and furthermore including a mounting ring encircling the main shaft and receiving the axial extensions of the two rotational parts and means securing the mounting ring and thereby the two rotational parts to the main shaft.

4,231,308

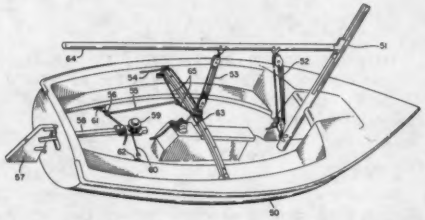
SAILING VESSEL SELF STEERER

Seymour Vall, Manhattan, N.Y., assignor to Falcon Safety Products, Inc., Mountainside, N.J.

Filed Feb. 5, 1979, Ser. No. 9,126

Int. Cl.³ B63H *25/04*

U.S. Cl. 114—144 R **6 Claims**



1. A self-steering system for maintaining a preselected course in a sailing vessel which system comprises in combination:

(A) balance reel assembly means comprising a balance reel; a balance line wound around said balance reel and having one end attached to the leeward side of said sailing vessel and one end attached to said balance reel, jamb cleat means and base means for supporting the aforesaid balance reel assembly means components, said base means

being detachedly attached to the tiller of said sailing vessel;

(B) steering line means having two ends, one end being attached to said jamb cleat means of said balance reel assembly means; and

(C) traveller control line means mounted transversly from the leeward to the windward side of said vessel, said traveller control line means being operatively connected intermediate to said sides to mainsheet means, said second end of said steering line means being connected to said traveller control line means at a point between said mainsheet means and said windward side of said vessel, whereby when tension is placed on said balance line, steering line means and traveller control line means by action of said balance reel a bend is formed in said traveller control line means in the vicinity of the point where said steering line means is connected to said traveller control line means, and whereby further changes in wind velocity or direction are directly translated by corresponding changes in the extent of the bend into simultaneous sail and rudder adjustments to return the vessel to a desired preselected course.

4,231,309

RUDDERS FOR BOATS, PARTICULARLY FOR PLEASURE BOATS

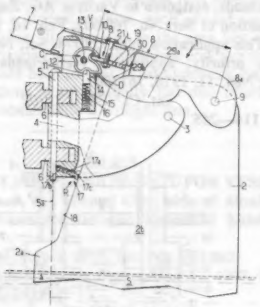
Jean Pelletier, Le Pradet, France, assignor to Coast Catamaran France S.A., Hyeres, France

Filed Mar. 27, 1978, Ser. No. 890,806

Claims priority, application France, Jul. 26, 1977, 77 22936

Int. Cl.³ B63H *25/38*

U.S. Cl. 114—162 **12 Claims**



1. A boat rudder comprising:

a rudder-blade hinged, in its upper part, to a substantially horizontal pin carried by a rudder-blade support, itself hinged about a substantially vertical pin, situated at the rear of the boat and carried by gudgeons fixed on this boat;

a bar fixed to a bar support, the rear part of this bar support being hinged to a substantially horizontal pin provided at the upper part of the rudder-blade;

a locking device for jamming the bar support in relation to the rudder-blade support, in a lower position of the rudder-blade corresponding to the normal working position, this locking device comprising a stop member, carried by the bar support, spaced longitudinally from the pin hinging the bar on the rudder-blade, said stop member being adapted to cooperate with a jamming member carried by the rudder blade support, the assembly of the stop member and the jamming member being arranged so as to ensure automatic unlocking of the bar support in relation to the rudder-blade support when the stress exerted on the rudder-blade exceeds a given limit greater than the stresses likely to be exerted on the rudder-blade during normal sailing,

characterised by the fact that it is provided with a balancing adjustment device comprising:

means for adjusting the normal working position of the rudder-blade with respect to the rudder-blade support so that the ratio of the areas of the rudder blade situated respectively in front and behind the hinge pin of the rudder-blade support (or its extension) may be adjusted;

and longitudinal displacement means for varying the distance between said stop member and the pin for hingeing the bar support on the rudder-blade, so as to set the locking in accordance with the position of the rudder-blade determined by the above adjustment means.

4,231,310

REMOTE CONTROL UNIT

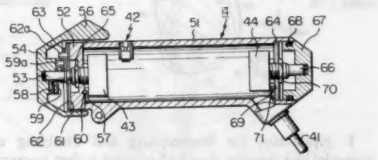
Shigeru Muramatsu, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Apr. 10, 1978, Ser. No. 895,109

Claims priority, application Japan, Apr. 20, 1977, 52-48973[U]

Int. Cl.³ B63H *25/00*

U.S. Cl. 114—144 RE **1 Claim**



1. An improved remote control unit, comprising:

(A) an elongated, generally cylindrical, main casing housing an A-M switch, a main variable resistor and a subordinate variable resistor;

(B) a main-dial rotatably coupled to one longitudinal end of said main casing and operationally coupled to said main variable resistor, said main-dial being rotatable about the longitudinal axis of said main casing over a prescribed angle on both sides of a zero-point responsive to an external force applied thereto;

(C) means for elastically and automatically restoring said main-dial to said zero-point when said external force is removed from said main-dial;

(D) a sub-dial rotatably coupled to the other longitudinal end of said main casing and operationally coupled to said subordinate variable resistor, said sub-dial being rotatable about said longitudinal axis of said main casing over a prescribed angle on both sides of a zero-point responsive to an external force applied thereto;

(E) said main-dial being operationally coupled to said main variable resistor via a shaft which is rotatably coupled to said main casing coaxially therewith and which extends through said one end of said main casing; and

(F) said elastically and automatically restoring means including:

(1) a driver disc coaxially secured to said shaft outside said one end of said main casing and provided with a pair of hooks projecting towards said main casing at symmetric positions on the periphery thereof;

(2) a stopper disc coaxially secured to said one end of said main disc while allowing free turning of said shaft and provided with a pair of hooks projecting towards said driver disc at symmetric positions on the periphery thereof; and

(3) an override spring interposed between said two discs and having a center helical portion loosely winding around said shaft and a pair of branches whose ends are

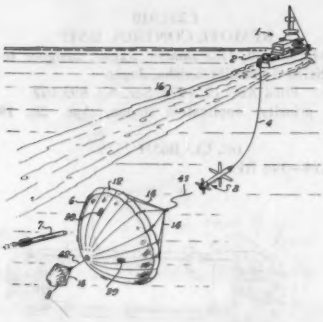
in abutting engagement with said hooks of said two discs in such an arrangement that turning of said shaft causes elastic deformation of said override spring via said driver disc.

4,231,311

TOWABLE POD ASSEMBLY FOR PROTECTIVELY DISABLING INCOMING TORPEDOES

Ernest P. Longerich, Chatsworth, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 1, 1978, Ser. No. 939,012
Int. Cl.[2] B63G 8/24
U.S. Cl. 114—244 **20 Claims**



1. Apparatus for intercepting and disabling underwater torpedo-like missiles directed toward a ship comprising:

a towable pod in the form of an elongate tube-like casing,

tow cable means for towing the pod aft of the ship,

means for detecting the incoming path of said missiles,

a missile-disabling main parachute stored in said tube-like pod casing, and

means for releasably deploying the main parachute into said incoming path for providing an intercept barrier for engaging and disabling the missiles.

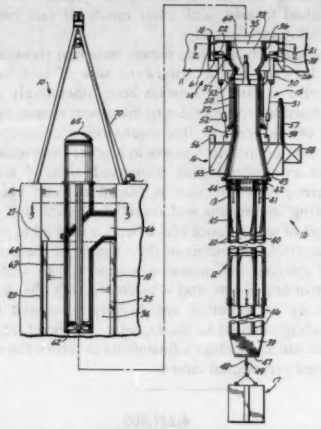
4,231,312

FLEXIBLE OCEAN UPWELLING PIPE

Abraham Person, Los Alamitos, Calif., assignor to Global Marine, Inc., Los Angeles, Calif.

Filed Aug. 21, 1978, Ser. No. 935,673
Int. Cl.[3] E02B 9/00
U.S. Cl. 114—264 **19 Claims**

1. An ocean engineering apparatus comprising a water flow pipe assembly adapted to be connected at an upper end thereof to a support structure, the support structure incorporating a pump operable for establishing and maintaining water flow through the pipe assembly to the support structure which is disposed adjacent the surface of an ocean and the like, the pipe assembly being adapted to extend essentially vertically in the ocean downwardly from the support structure to a lower end disposed a substantial distance below the support structure and above the ocean floor, the pipe assembly defining at least one essentially continuous water flow conduit extending essentially from end-to-end of the pipe assembly, motion accommodating connection means for connecting the upper end of the pipe assembly to the support structure and for isolating from the pipe assembly essentially all motions of the support structure about horizontal axes, the conduit over a major portion of its length being defined essentially of a material having positive buoyancy in sea water and which has an effective modulus of elasticity in the temperature range of from about 40 degrees F. to about 90 degrees F. not in excess of about 100,000 pounds per square inch for at least one hour, and ballast means connected to the lower end of the pipe assembly having net negative buoyancy in sea water sufficiently correlated to the positive buoyancy of the conduit material to establish in the conduit material at the upper end of the conduit a selected low tensile stress in the conduit material.

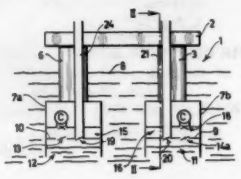


4,231,313

STABILIZING SYSTEM ON A SEMI-SUBMERSIBLE CRANE VESSEL

Pieter S. Heerema, Kapellen, Belgium; Alexandre Horowitz, Eindhoven, and Henricus P. Willemsen, Aarle-Rixtel, both of Netherlands, assignors to Varitrac AG, Zug, Switzerland

Continuation of Ser. No. 769,002, Feb. 16, 1977, abandoned. This application Jun. 7, 1978, Ser. No. 913,608
Claims priority, application Netherlands, Feb. 19, 1976, 7601712; Nov. 11, 1976, 7613007
Int. Cl.[3] B63B 35/02
U.S. Cl. 114—265 **7 Claims**



1. A semi-submersible crane vessel comprising a platform, a plurality of vertical hollow columns supporting the platform, said columns being distributed along a circumferential outer region of the vessel, submerged bouyancy hulls supporting said columns such that the platform is above water level, and a stabilizing system for stabilizing the vessel with respect to outboard handling of loads by at least one crane on the vessel, said stabilizing system comprising ballast chambers in said bouyancy hulls, valve means for selectively admitting surrounding water into said chambers, said chambers comprising (a) air chambers at the lower ends of said columns at the level of said submerged buoyancy hulls; (b) said air chambers having a top closure below the level of the water surrounding said submerged buoyancy hulls, a bottom connection in communication with the surrounding water and vertical air conduits extending upwardly from said chambers for connecting the latter to ambient atmosphere; (c) means for controlling said valves for admission of desired amounts of water into said air chambers during handling of a crane load in dependence on the weight of said loads and the position of said loads with respect

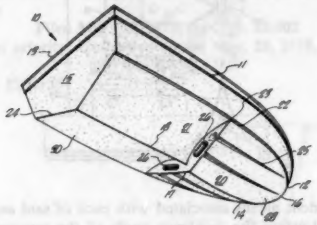
to said vessel and measuring means including gauging means for measuring the water level in each said air chamber, said gauging means including an air pressure sensor for each of said air chambers and a water pressure sensor at the exit of each said chamber to the surrounding water, the difference between said sensed pressures being indicative of the water level in each said first air chamber.

4,231,314

HYDROPLANE BOAT

Michael Peters, 2700 Severance St., Los Angeles, Calif. 90007

Filed Feb. 17, 1978, Ser. No. 878,751
Int. Cl.² B63B *1/00*
U.S. Cl. 114—291 **19 Claims**



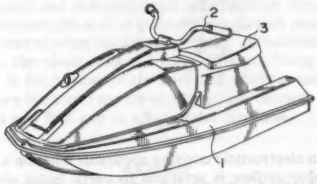
1. A hydroplane boat comprising
a hull including two generally V-shaped sections being disposed one aft of the other,
a transverse step in said hull separating said V-shaped sections, and
continuous chines from stem to stern,
wherein the aft hull section comprises two surface portions separated by a central keelson, each of said surface portions being generally concave in the area just aft of said step, and becoming progressively less concave toward the transom of said boat so that at said transom, each of said surface portions is substantially flat and intersects said transom in substantially a straight line.

4,231,315

WATER-JET PROPULSION UNIT FOR VESSELS

Hisataro Tachibana, and Hiromi Ono, both of Akashi, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed May 8, 1978, Ser. No. 903,803
Claims priority, application Japan, May 12, 1977, 52/54930; May 13, 1977, 52/55825
Int. Cl.² B63H *11/00*
U.S. Cl. 440—43 **5 Claims**



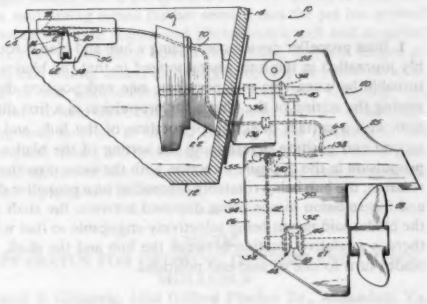
1. A water-jet propulsion unit for a vessel which comprises water duct means having inlet means and an outlet nozzle means variable between a horizontal rearward orientation and a vertical downward orientation, and power-driven impeller means disposed in said duct means for forcing water from the inlet means to said outlet nozzle means, said outlet nozzle means comprising an upper nozzle element means having opposite side edges and a lower nozzle element means also having opposite side edges, said upper and lower nozzle element means being disposed with the side edges on one nozzle element means in slidable engagement with the side edges on the other nozzle element means, said upper nozzle element means and said lower nozzle element means being of cross-sectional configurations to define a closed area between them, one of said nozzle element means being mounted for swingable movement about a horizontal axis, resilient means for biasing the other nozzle element means into slidable engagement with said one nozzle element means at the side edges so that when said one nozzle element means is moved from a horizontal position to a vertical position the other said nozzle element means is slidable moved to a position staggered with respect to said one nozzle element means to provide a vertically directed outlet nozzle means.

4,231,316

ACTUATION MEANS FOR MARINE PROPULSION DEVICE TRANSMISSION

Gerald F. Bland, Kenosha, Wis., and Guy D. Payne, Lake Villa, Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed Mar. 27, 1978, Ser. No. 890,499
Int. Cl.² B63H *5/13, 21/28;* G05G *7/02*
U.S. Cl. 440—86 **20 Claims**

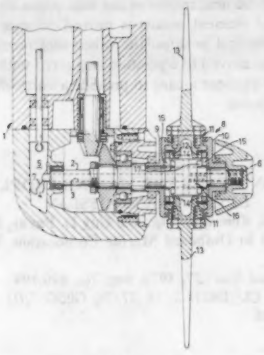


1. A marine propulsion device comprising a propulsion unit, a propeller shaft rotatably mounted in said propulsion unit and carrying a propeller, a drive shaft rotatably mounted in said propulsion unit, a reversing transmission connecting said drive shaft to said propeller shaft and shiftable between a neutral condition and a drive condition, shifting means including an actuating member mounted in said propulsion unit for reciprocal movement relative to a neutral position and connected to said reversing transmission for operating said reversing transmission in response to movement of said actuating member, a clutch shift lever mounted for reciprocal movement, and means connecting said shift lever to said actuating member for effecting movement of said actuating member in response to movement of said shift lever, said connecting means including first and second flexible shift cables each having a first end and a second end, means operably connecting said first ends of said shift cables to said shift lever and connecting said second ends of said shift cables to said actuating member such that, in response to movement of said shift lever in one direction, said first shift cable is pulled in a first direction for effecting movement of said actuating member in one direction relative to its neutral position and said second shift cable is moved in a second direction opposite to said first direction and such that, in response to movement of said shift lever in the other direction, said second shift cable is pulled in said first direction for effecting movement of said actuating member in the other direction relative to its neutral position and said first shift cable is moved in said second direction.

4,231,317
BOAT PROPELLER DEVICE

Lennart H. Brandt, Fjäras, and Staffan T. Mansson, Hjälteby, both of Sweden, assignors to AB Volvo Penta, Goteborg, Sweden

Filed Jun. 19, 1979, Ser. No. 49,649
Claims priority, application Sweden, Jul. 19, 1978, 7807965
Int. Cl.³ B63H *3/02*
U.S. Cl. 440—50 **6 Claims**



1. Boat propeller device comprising a hub and blades rotatably journalled in the hub, characterized in that the blades are turnable between two end positions, one end position determining the setting of the blades for propulsion in a first direction with a certain direction of rotation of the hub, and the second end position determining the setting of the blades for propulsion in the opposite direction with the same direction of rotation, the hub being rotatably journalled on a propeller shaft and transmission means being disposed between the shaft and the blades said means being selectively engagable so that when there is a relative rotation between the hub and the shaft, the blades turn to one of said end positions.

4,231,318
DUAL BLADE COATER

Stanley C. Zink, Fulton, N.Y., assignor to The Black Clawson Company, Middletown, Ohio

Filed Jul. 3, 1978, Ser. No. 921,502
Int. Cl.² B05C *11/04*
U.S. Cl. 118—122 **8 Claims**

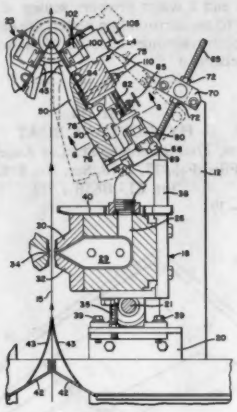
1. A twin-blade coater for applying coating materials simultaneously to the opposite sides of a vertically moving web of paper or the like,

a pair of generally opposed fountain-type applicators positioned on opposite sides of said vertically moving web in non-contacting relation to said web and each adapted to impinge a stream of coating material against said web,

means mounting said applicators for transverse pivotal movement with respect to said web whereby the region of impingement of coating material from each of said applicators may be independently varied,

a pair of metering blade assemblies, means mounting said assemblies on said frame for pivotal movement about a common transverse pivot axis vertically spaced from said applicators,

blade means on each of said blade assemblies coacting with said web at a common transverse region substantially coincidental with said pivot axis, and

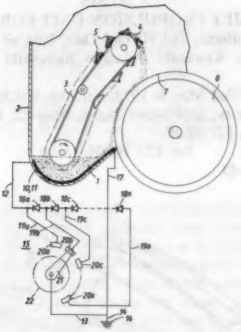


independent means associated with each of said assemblies for adjusting the incidence angle of the associated said blade means independently of the other said assembly.

4,231,319
ELECTROSTATIC COPYING APPARATUS

Gottfried Waibel, Rossleithen; Günther Maurischat, and Heinz Websersik, both of Munich, all of Fed. Rep. of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Fed. Rep. of Germany

Filed Apr. 4, 1978, Ser. No. 893,358
Claims priority, application Fed. Rep. of Germany, Apr. 9, 1977, 2715904
Int. Cl.³ G03G *13/00*
U.S. Cl. 118—655 **4 Claims**



1. In an electrostatic copying apparatus wherein a travelling xerographic surface is arranged to carry latent electrostatic images in a predetermined path, a developing device for converting said latent images into powder images, comprising a receptacle for a supply of intermixed toner and carrier particles; a conveyor for withdrawing intermixed particles from said supply and to cascade the withdrawn particles over latent images in said path whereby the surplus of such particles reenters said receptacle and the particles become electrostatically charged as a result of triboelectrification during circulation in and back into said receptacle; an electrode mounted in said receptacle electrically insulated therefrom and positioned to

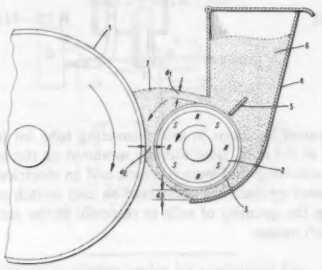
contact the circulating particles; and electrically conductive means for limiting the electrostatic charge of said particles to a maximum desired value by connecting said electrode to ground when the electrostatic charge of said particles exceeds said maximum value, said means comprising a plurality of elements each connected between said electrode and ground and each operative to become electrically conductive and to thereby ground said electrode when the electrostatic charge of said particles exceeds one of a plurality of different values which are different for the different elements.

4,231,320

MAGNETIC BRUSH-TONER SUPPLY HOPPER

Masumi Asanae, Kamugaya, and Keitaro Yamashita, Kamisato, both of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Filed Mar. 22, 1979, Ser. No. 23,002
Claims priority, application Japan, Mar. 23, 1978, 53-33531
Int. Cl.³ G03G *15/09*
U.S. Cl. 118—657 **3 Claims**



1. A developing machine for magnetic toner having a toner supply tank with an opening, a rotatable non-magnetic cylindrical shell disposed in said opening, its cylindrical surface partially protruding into the toner supply tank and a rotatable magnet roll disposed in said cylindrical shell, said magnet roll being adapted to rotate for drawing magnetic toner out of said toner supply tank, transporting the magnetic toner around said cylindrical shell to contact a support for electrostatic latent images and then drawing unused toner again into the toner supply tank, characterized in that the width of a first gap between a wall of the toner supply tank and the cylindrical shell for drawing unused magnetic toner back into the tank is made smaller than the maximum transportation depth for magnetic toner on the cylindrical shell and greater than both the width of a second gap between a wall of the toner supply tank and the cylindrical shell for drawing magnetic toner out of the supply tank and also the width of a third gap between the latent image support and the cylindrical shell, leakage through said first gap between the wall of the toner supply tank and the shell being prevented when the magnet roll and cylindrical shell are stationary, the plane defined by said first gap being oriented vertically at the bottom of the shell and wherein said unused toner drawn back into the toner supply tank through said first gap enters said first gap in a horizontal direction.

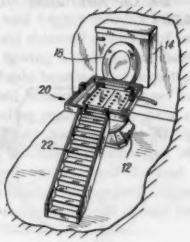
4,231,321

PET ACCESSORY FOR USE WITH A COMMODE

Floraine Cohen, 425 E. 80th St., New York, N.Y. 10021

Filed Jan. 11, 1979, Ser. No. 2,566
Int. Cl.³ A01K *29/00*
U.S. Cl. 119—1 **1 Claim**

1. A pet accessory for attachment to a commode comprising a support having an opening adapted to be located over said commode, trap door means for selectively obturating said opening, electro-mechanical means for operating said trap door means, sensing means for sensing when a pet has been on and departed from said trap door means for actuating said electro-mechanical means, cleansing means for cleansing said trap door means under the control of said sensing means, said cleansing means including an electromagnetic valve coupled to said sensing means, said support including depending protrusions for extending into said commode and locating the support on said commode, said electromechanical means including reversible motors and said trap door means including flaps operated by said motors, timing means to control the length of time said trap door means is operated, and a ramp leading to said support, said cleansing means including a perforated tube detachably resting on said support, said sensing means includes



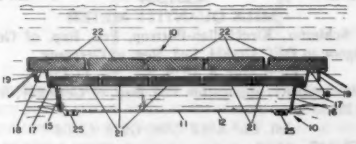
a light source and a photoelectric cell in operative combination, said timing means further sensing that the pet has arrived between the light source and photoelectric cell and departed therefrom in sequence before controlling the said length of time, said timing means including a flip-flop and inverter coupled to said photoelectric cell, an AND gate coupling said flip-flop to said electromechanical means, a delay means coupling said inverter to to said flip-flop for a resetting of the latter, and timing and reversing means coupling said AND gate to said electromechanical means whereby the trap door means is first opened and then closed.

4,231,322

APPARATUS FOR GROWING OYSTERS AND OTHER MOLLUSCS

Donald S. Gilpatric, 4304 Gifford Pinchot Dr., Annandale, Va. 22003

Division of Ser. No. 925,765, Jul. 18, 1978, Pat. No. 4,186,687.
This application Jul. 2, 1979, Ser. No. 53,858
Int. Cl.³ A01K *61/00*
U.S. Cl. 119—4 **15 Claims**



1. Apparatus for sustaining the growth of oysters and other molluscs in multiple water environments comprising in combination an elongated open-top receptacle which can be moved and placed on any form of coastal or estuarine bottom strata with tidal seawater flows containing adequate nutrients and other marine environmental requirements for the growth of oysters and other molluscs, and plural sets of multiple foraminous cribs for containing oysters and other molluscs of various sizes for off-bottom rearing and maturing to marketable qualities, said receptacle having a bottom, opposite side walls and end walls extending upwardly from said bottom, support means intermediate the open top and bottom of said receptacle supporting and protectively housing a first set of said foraminous cribs side by side within said receptacle, said second set of foraminous cribs being supported side by side, transversely

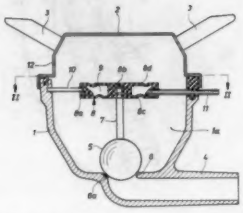
across the open top of said receptacle and superimposed over said first set of cribs, said first set of cribs having smaller size openings than the openings of said second set adapting said first set of cribs to contain oysters of a smaller size than the cribs of said second set.

4,231,323

MILKING MACHINE CLAW

Karl E. Olander, Sodertalje, Sweden, assignor to Alfa-Laval AB, Tumba, Sweden

Filed May 21, 1979, Ser. No. 41,102
Claims priority, application Sweden, May 26, 1978, 7806050
Int. Cl.³ A01J *5/00, 7/00*
U.S. Cl. 119—14.08 **5 Claims**



1. In a milk claw for milking machines, the combination of a housing forming a milk manifold and adapted for connecting said manifold to the teat cups of a milking machine, the housing having an outlet from said manifold, a valve for controlling said outlet and including a valve seat in the housing and a valve member coacting with said seat to open and close the valve, there being a leak opening which allows a small flow through said valve in the closed position thereof, and a pneumatic operating member structurally supported in the housing and connected to the valve for operating the same, said operating member comprising two flexible diaphragms which define between the diaphragms a working chamber separated from the milk manifold, one of said diaphragms having a larger area than the other diaphragm, both of said diaphragms being exposed outside said working chamber to the pressure in the milk manifold, whereby said operating member is actuated by variations in the difference between the pressures in said manifold and said working chamber.

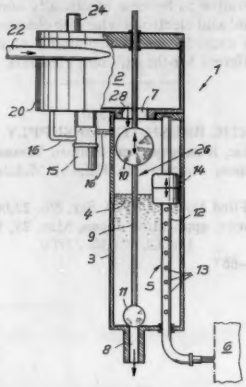
4,231,324

MILK QUANTITY METER

Peter Schletter, Kirchhellen-Bottrop, Fed. Rep. of Germany, assignor to DEC GmbH, Fed. Rep. of Germany

Filed Mar. 5, 1979, Ser. No. 17,234
Claims priority, application Fed. Rep. of Germany, Mar. 10, 1978, 2810376
Int. Cl.³ A01J *7/00;* **G01F** *15/08*
U.S. Cl. 119—14.17 **4 Claims**

1. In combination with a milk quantity meter for use in milking stations for directly measuring a quantity of milk for a quantity of milk and entrained air yielded by a cow during a milking of the type having a container for receiving milk and entrained air, means for directing milk and entrained air into said container and for separating said milk and air, air vent means associated with said container for the discharging of the air, a milk measuring receptacle adjacent to said container, connecting means providing fluid communication between said container and said receptacle such that the separated milk flows into said receptacle, the milk measuring receptacle having a closed cylinder vertically disposed below the separation chamber, said cylinder having a milk inlet opening at its upper end surface in fluid communication with said separation chamber and a milk outlet opening at its lower end surface concentrically of said milk inlet, shutoff means disposed within said receptacle alternately opening and closing both said milk inlet opening and said milk outlet opening, the improvement comprising sensing means for sensing the level of milk within the receptacle as an indication of the quantity thereof including a measuring tube extending coaxially with the receptacle axis within the receptacle, switch means arranged at predetermined



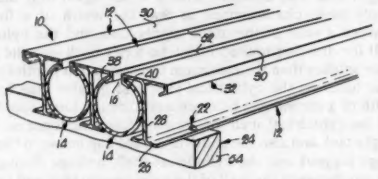
axially spaced locations in said measuring tube for indicating the level of the milk, float slidably mounted on the measuring tube for actuating said switch means and an electrically operated counter operatively connected to said switch means for indicating the quantity of milk in response to the actuation of said switch means.

4,231,325

MODULAR, WASTE COLLECTING AND DRAINING FLOOR APPARATUS

Donald M. Parks, R.R. #4, Chillicothe, Mo. 64601

Filed Jun. 6, 1979, Ser. No. 46,050
Int. Cl.³ A01K *1/01*
U.S. Cl. 119—28 **2 Claims**



1. In modular, waste collecting and draining, floor apparatus adapted for installation upon underlying support means of various types, including those of type involving a directly underlying sub-floor:

a plurality of elongate assemblies each having a base, structure rising from said base, and a floor strip supported above said base by said structure;

means for mounting said assemblies upon said underlying support means with said assemblies in spaced, generally parallel relationship to each other to present an elongate chamber between said structures of each adjacent pair of assemblies and with the adjacent edges of each adjacent pair of said strips in spaced, generally parallel relationship to each other to present an elongate slot between each of said pairs of adjacent edges in communication with the corresponding of said chambers; and

a plurality of trough means respectively disposed within said

chambers and each in communication with the corresponding of said slots for receiving and draining away waste materials passing downwardly through said slots between said strips;

each of said trough means comprising an elongate, generally cylindrical pipe-like element resting upon said underlying support means, oppositely engaging said structures of the adjacent assemblies and having an elongate opening along its upper surface in communication with the corresponding of said slots,

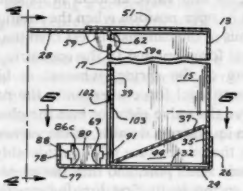
each of said strips being provided with flange means depending from the edges thereof and extending into said opening of the corresponsing of said elements whereby said flange means operate to maintain said openings in communication with said slots and said elements operate to couple said assemblies in their said relationships.

4,231,326

DOG FOOD CONTAINER AND FEEDER

David P. Hager, Deer River, Minn. 56636

Filed Nov. 24, 1978, Ser. No. 963,386
Int. Cl.³ A01K *5/00*
U.S. Cl. 119—52 R **18 Claims**



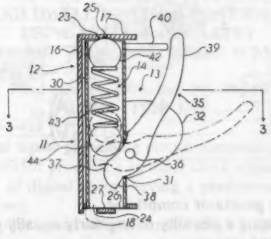
1. A shipping container feeder for containing feed, comprising a front wall, a rear wall, a bottom closure flap, and side walls joined to one another to form a generally rectangular box shaped bin having an interior and a generally rectangular tray that includes a rectangular bottom wall having one edge integrally joined to the bottom closure flap to extend away from the front wall, a front edge and opposite side edges, a tray vertical front wall joined to the front edge, and opposite tray vertical side walls joined to the side edges, tab means for joining the tray front wall to the tray side walls, a vertical reinforcing panel in the bin interior abutting against the bin front wall and tab means for joining the reinforcing panel to the tray side walls, the bin front wall and panel having openings therethrough to permit flow of feed from the bin interior to the tray.

4,231,327

RELEASABLE ANIMAL HITCHING APPARATUS

William L. Mader, Ekalaka, Mont. 59324

Filed Jan. 2, 1979, Ser. No. 337
Int. Cl.³ B68B *1/00*; A01K *3/00*
U.S. Cl. 119—110 **10 Claims**



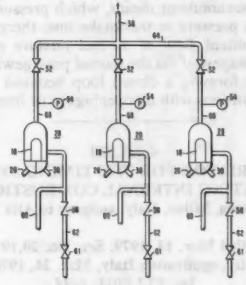
1. A releasable animal hitching apparatus including a support member, hitching means movably carried by said support member, and biasing means associated with said hitching means, said support member including a main section and transverse sections extending substantially perpendicularly from said main section adjacent the ends thereof, said main section including means for fastening said support member to a supporting surface, each of said end sections having a recess therein facing the corresponding recess in said other end section, said hitching means including a hollow housing disposed between said recesses of said end sections, an opening in the sidewall of said housing, at least one bracket section extending outwardly from the external sidewall of said housing adjacent said opening thereof, a trigger member pivotally connected to said bracket section, said trigger member having a first portion extending through said sidewall opening of said housing, said first trigger portion having a rounded surface area extending toward the center of said housing and stop means adjacent the internal surface of said housing, said trigger member having a second portion extending generally along and spaced from said external sidewall of said housing, said biasing means being disposed within said housing and extending between said first portion of said trigger member and the end of said housing remote therefrom, whereby said second trigger portion end is urged toward said external sidewall of said housing.

4,231,328

AUTOMATIC STEAM GENERATOR FEEDWATER REALIGNMENT SYSTEM

Glenn E. Lang, Winfield Township, Butler County; Milburn E. Crotzer, Monroeville, and John S. Fuoto, Irwin, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 18, 1978, Ser. No. 925,720
Int. Cl.² F22B *1/06*, *37/42*
U.S. Cl. 122—504 **7 Claims**



1. A method of automatically realigning a steam generator secondary piping system in the event of a pipe break to a given steam generator in a system having plural steam generators sharing in part a common piping system comprising the steps of:

monitoring the pressure in the respective steam generator steam exit lines and providing corresponding electrical outputs representative of the pressure monitored;

comparing the respective monitored outputs to a first predetermined setpoint and identifying through a corresponding second electrical output when any of the respective monitored values drops below the first setpoint;

closing the steam exit lines to the respective steam generators in response to the second electrical output;

comparing the respective monitored outputs to a second predetermined setpoint after the steam exit lines are closed;

identifying from the second setpoint comparison the respective monitored value that drops below the second setpoint and the corresponding steam generator, through a third electrical output; and

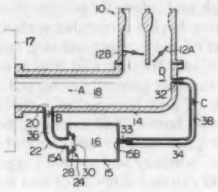
closing the feedwater line to the steam generator exhibiting the drop in pressure below the second setpoint, in response to the third electrical output.

4,231,329

APPARATUS FOR ATOMIZING FUEL IN AN INTERNAL COMBUSTION ENGINE

Yasuhiko Ishida, Mishima, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Dec. 4, 1978, Ser. No. 966,122
Claims priority, application Japan, Mar. 7, 1978, 53-24989
Int. Cl.³ F02B *27/00*
U.S. Cl. 123—52 MB **11 Claims**



1. An apparatus for improving atomization of fuel in an air-fuel mixture passing through an intake line of an internal combustion engine, said apparatus comprising:

first passageway means opened to the intake line at a first position thereof;

second passageway means opened to the intake line at a second position thereof, the flow area of the second passageway means being substantially smaller than that of the first passageway means, and

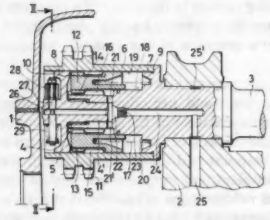
pressure accumulator means located between the first and second passageway means for producing a pressure in the pressure accumulator means, which pressure is close to a maximum pressure in the intake line, thereby generating an intermittent flow of air-fuel mixture ejected to the intake passageway via the second passageway means, said apparatus forming a closed loop between said first and second positions with no openings to or from atmosphere.

4,231,330

TIMING VARIATOR FOR THE TIMING SYSTEM OF A RECIPROCATING INTERNAL COMBUSTION ENGINE

Giampaolo Garcea, Milan, Italy, assignor to Alfa Romeo S.p.A., Milan, Italy

Filed Mar. 13, 1979, Ser. No. 20,193
Claims priority, application Italy, Mar. 24, 1978, 21650 A/78
Int. Cl.³ F01L *1/34*
U.S. Cl. 123—90.15 **2 Claims**



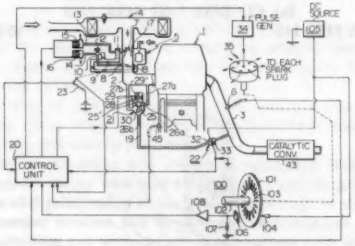
1. An internal combustion engine especially for motor vehicles in which the intake valves are controlled by one camshaft and the exhaust valves by a different camshaft, both of said camshafts being provided at one end with a gear for their drive by means of the engine crankshaft and for their appropriate timing relative to said crakshaft, the coupling of at least one of said camshafts with its gear being made by way of an intermediate member constituted by an annular piston provided with a first groove in the gear, and with a second groove which engages in a groove in the shaft, at least one of said grooves in the annular piston and the groove with which it engages being helical so that the other groove of the annular piston and the groove with which it engages can be longitudinal, said annular piston being able to make an axial sliding movement along the axis of the camshaft and of the gear, said sliding movement being limited by two limiting contact surfaces which are fixed relative to the shaft, the loading of a spring in the direction of the camshaft axis tending to keep the annular piston in a first of the two limiting positions, whereas the pressure of the engine lubricating oil can exert on one surface of the annular piston a force capable of overcoming the loading of said spring so as to move it axially and to keep it in the second of the two limiting positions, the lubricating oil flowing through a small port to the cavity in which the annular piston is located, wherein said cavity can be connected to the outside through a slide valve, the valve element of which moves in a direction normal to the camshaft axis in being displaced from the opening to the closure position, said valve element being provided with a single mass eccentric to the camshaft axis, the force of a preloaded spring acting on said valve element in its sliding direction to maintain it in its open position when the rotational speed of the engine and thus of the camshaft is less than the value for which the centrifugal force applied to the eccentric mass is equal to the preloading of the spring, whereas at higher rotational speeds the centrifugal force overcomes the preloading of the spring to move the valve element into the closure position, so that, at speeds less than said value, as the valve element is in the open position the oil pressure falls considerably because of the existence of said small port, and thus the annular piston is kept by the axial spring in its first limiting position, whereas, at speeds higher than said value, as the valve element is in the closure position, the annular piston is moved to, and kept, in its second limiting position by the oil pressure such that, because of the path of one of the grooves in said annular piston, at speeds lower than said value a first determined timing of the camshaft is obtained relative to the driveshaft, whereas at higher speeds a second determined timing is obtained.

4,231,331

PULSE GENERATOR OF THE CORONA DISCHARGE TYPE FOR SENSING ENGINE CRANKSHAFT ANGLE ON AN ENGINE CONTROL SYSTEM

Suzuo Suzuki; Hastuo Nagaishi, both of Yokosuka, and Kenji Masaki, Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama City, Japan

Filed Aug. 1, 1978, Ser. No. 930,033
Claims priority, application Japan, Aug. 8, 1977, 52/94795; Aug. 10, 1977, 52/95802
Int. Cl.³ F02P *5/04*; F02M *25/06*; G01P *3/48*
U.S. Cl. 123—416 **24 Claims**



1. A pulse generator comprising:

a rotor having a plurality of angularly equally spaced apart segmented regions;

electrode means stationarily mounted with respect to said

rotor to define an air gap with each one of said segmented regions upon rotation of said rotor and connected to a source of DC potential to form a corona discharge generating electrical circuit through said air gap to successively generate corona discharges across said air gap upon rotation of said rotor; and

an impedance element provided in said corona discharge generating electrical circuit to develop voltage pulses in response to said corona discharges.

12. A spark timing and exhaust gas recirculation control system for an internal combustion engine, comprising:

means for producing a signal representative of the amount of exhaust gases recirculated through said engine;

means for producing a signal representative of the speed of said engine;

means for generating a first pulse in response to an engine cylinder reaching a reference point of its combustion cycle and second pulses the frequency of which is proportional to the speed of said engine;

means for producing a signal representative of power which said engine delivers;

first storage means in which is stored a set of data each representative of the spark timing of said engine cylinder as a function of a set of engine speed and engine power values for generating a corresponding output in response to said signals representative of said engine speed and engine power;

second storage means in which is stored a set of data each representative of the rate of exhaust gas recirculation as a function of a set of engine speed and engine power values for generating a corresponding output in response to said signals representative of said engine speed and engine power;

counter means arranged to be preset in accordance with the output from said first storage means for counting said second pulses in response to each said first pulse and generating a spark timing pulse in response to the counted second pulses reaching said preset count value; and

means for comparing said signal representative of the amount of recirculated gases with the output from said second storage means to detect the difference therebetween for regulating said recirculated gases;

wherein said means for generating first and second pulses comprises a rotor mounted for revolution with said engine and having a plurality of angularly equally spaced apart segmented regions, electrode means stationarily mounted with respect to said rotor to define an air gap with each one of said segmented regions upon rotation of said rotor and connected to a source of DC potential to form a corona discharge through said air gap to successively generate corona discharges across said air gap upon rotation of said rotor, and an impedance element responsive to each of said corona discharges to develop a signal corresponding to said first and second pulses, one of said segmented regions having a different dimension from the dimension of the other segmented regions and being arranged in said rotor to coincide with the path of said corona discharge in response to said engine cylinder reaching said reference point.

4,231,332

SPARK AND DWELL IGNITION CONTROL SYSTEM USING DIGITAL CIRCUITRY

Robert S. Wrathall, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 15, 1979, Ser. No. 49,016
Int. Cl.³ F02P 5/04
U.S. Cl. 123—416 **15 Claims**

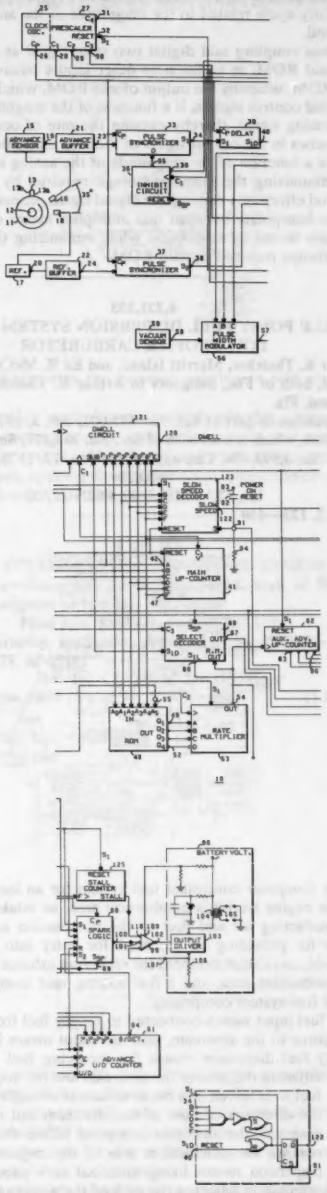
1. A digital signal processing circuit comprising:

clock means for producing an input clock signal comprising a series of digital pulses having a predetermined rate of occurrence;

rate multiplier means coupled to said clock means for receiving said input signal and producing a corresponding output signal by selectively multiplying (dividing) the rate occurrence of the input clock signal pulses in accordance with received control signals;

control means coupled to said rate multiplier means for producing and supplying said control signals for controlling the rate multiplication of said rate multiplier means, said control means comprising a read only memory means (ROM) with the output of the ROM determining said control signals;

accumulator means coupled to said rate multiplier means for



receiving said output signal and accumulating a count related to the pulse count of said output signal;

wherein the improvement comprises said control means including,

pulse width modulation means for receiving an analog signal and producing a periodic digital two state signal having a duty cycle related to the magnitude of the analog signal, and

means coupling said digital two state signal as an input to said ROM, in addition to other inputs received by said ROM, whereby the output of said ROM, which comprises said control signals, is a function of the magnitude of said analog signal, thereby causing the rate of occurrence of pulses in the output signal of the rate multiplier means to be a function of the magnitude of the analog signal while minimizing the memory storage required by said ROM and effectively causing the digital signal processing circuit to interpolate between rate multiplier means control signals stored by said ROM while minimizing the memory storage required by said ROM.

4,231,333

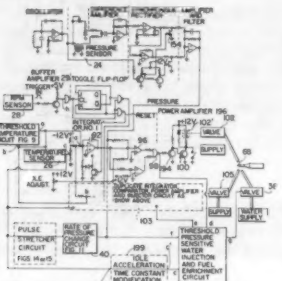
SINGLE POINT FUEL DISPERSION SYSTEM USING A LOW PROFILE CARBURETOR

Arthur K. Thatcher, Merritt Island, and Ed R. McCarter, Maitland, both of Fla., assignors to Arthur K. Thatcher, Merritt Island, Fla.

Continuation-in-part of Ser. No. 593,001, Jul. 3, 1975, Pat. No. 4,100,896, which is a division of Ser. No. 293,377, Sep. 29, 1972, Pat. No. 3,893,434. This application Jan. 12, 1978, Ser. No. 868,825

Int. Cl.[3] F02B *3/00*; F02N *17/00*

U.S. Cl. 123—440 **27 Claims**



1. A computer controlled fuel system for an internal combustion engine having a combustion area, an intake manifold for conducting air and fuel to the combustion area, an air source for providing an airstream for entry into the intake manifold, an exhaust manifold for removing exhaust gases from the combustion area, and a fuel source, said computer controlled fuel system comprising

(A) fuel input means connected to supply fuel from the fuel source to the airstream, said fuel input means including

(1) fuel dispersion means for receiving fuel at a point adjacent the path of the airstream and for dispersing the fuel so received into the airstream at an angle relative to the direction of flow of the airstream and toward the center of the airstream at a point before the airstream reaches the combustion area of the engine, said fuel dispersion means being mounted in a predetermined orientation adjacent the path of the airstream, and

(2) fuel injection means for receiving fuel from the fuel source and for directing a flow of fuel so received to said fuel dispersion means for dispersion into the airstream; and

(B) a fuel computer means connected with said fuel input means for controlling the flow of fuel from said fuel injection means to supply a predetermined fuel-air ratio to the intake manifold in response to sensed engine conditions as long as such engine conditions remain within predetermined limits, said fuel computer means including threshold means for providing additional fuel flow to said fuel dispersion means from said fuel injection means whenever a sensed engine condition goes beyond a predetermined threshold level.

4,231,334

METHOD AND APPARATUS FOR DETERMINING THE PROPORTIONS OF THE CONSTITUENTS OF THE AIR-FUEL MIXTURE SUPPLIED TO AN INTERNAL COMBUSTION ENGINE

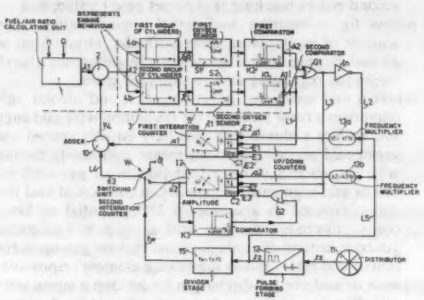
Cornelius Peter, Stuttgart, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 27, 1978, Ser. No. 890,163

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1977, 2713988

Int. Cl.[3] F02M *25/06*

U.S. Cl. 123—440 **14 Claims**



1. A method for determining the proportions of the air-fuel mixture constituents supplied to an internal combustion engine having an exhaust gas conduit system and a mixture preparing device associated therewith, said air-fuel mixture constituents being supplied by the mixture preparing device which has at least two oxygen sensors arranged in the exhaust gas conduit system, comprising the steps of:

detecting the rpm of and the air flow rate to the engine, calculating the air-fuel ratio which determines the fuel quantity to be delivered to the engine, and generating a signal representative of this air-fuel ratio;

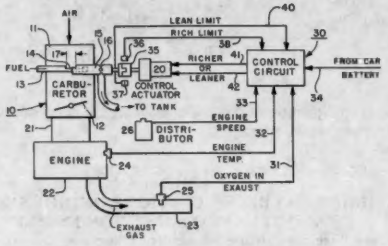
integrating the output signals from each of the oxygen sensors; and

applying the integrated output signals to the generated representative signal of the air-fuel ratio and oscillating the representative signal about a predetermined air-fuel ratio value and at a predetermined amplitude, thereby regulating the average value of the overall exhaust gas composition to the predetermined air-fuel ratio value.

4,231,335
CONTROL SYSTEM FOR REGULATING AIR/FUEL RATIO

Irving H. Hallberg; Howard C. Paul, both of Des Plaines; Ronald R. Ralston, Elmhurst, and Roy E. Hunninghaus, Des Plaines, all of Ill., assignors to Borg-Warner Corporation, Chicago, Ill.

Continuation of Ser. No. 797,159, May 16, 1977, abandoned.
This application Apr. 6, 1979, Ser. No. 27,649
Int. Cl.³ F02M *7/18*
U.S. Cl. 123—440 **5 Claims**



1. A control system for regulating the air/fuel ratio of the mixture delivered to an engine in which virtually all of the gasoline is burned, and the exhaust gas is discharged through an exhaust conduit, comprising:

a sensor positioned to contact the exhaust gas and develop an electrical control signal which varies as a function of the proportion of at least one component gas in the discharged exhaust gas;

a control actuator, positioned for movement to regulate the air/fuel ratio; and

a control circuit, connected to receive said control signal and including switching means connected to displace the control actuator continually in a direction which is a function of that signal, driving the air/fuel ratio sequentially toward richer and leaner mixtures in accordance with the instantaneous value of the control signal, thus producing an optimum stoichiometric value of the air/fuel ratio, an adjustable power supply coupled to said switching means for regulating the displacement rate of the control actuator, and means connected to supply an engine-speed-indicating signal to the adjustable power supply, so that the rate of change of the air/fuel ratio is a function of engine speed.

4,231,336
EXHAUST GAS RECIRCULATION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Kiyoshi Yuuki, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Apr. 20, 1979, Ser. No. 31,779
Claims priority, application Japan, Sep. 12, 1978, 53/112745
Int. Cl.³ F02M *25/06*
U.S. Cl. 123—568 **5 Claims**

1. An exhaust gas recirculation system for an internal combustion engine, comprising:

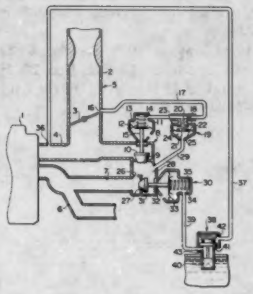
an exhaust gas recirculation passage,

an exhaust gas recirculation control valve provided at a middle portion of said exhaust gas recirculation passage which has a diaphragm chamber and is adapted to increase its opening as vacuum supplied to its diaphragm chamber increases,

a vacuum passage which conducts engine intake vacuum to said diaphragm chamber,

an orifice means provided at a middle portion of said exhaust gas recirculation passage which is upstream of said exhaust gas recirculation control valve so as to define a chamber space positioned between said orifice means and said exhaust gas recirculation control valve,

a vacuum control valve provided at a middle portion of said vacuum passage which controls level of the vacuum supplied through said vacuum passage to the diaphragm chamber of said exhaust gas recirculation control valve in



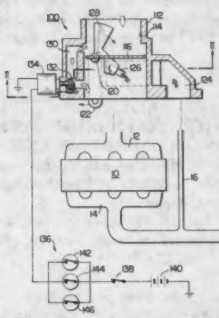
accordance with the pressure existing in said chamber space,

and an orifice control system which provides a substantial basic opening area in said orifice means and increases opening area of said orifice means so as to be larger than said basic opening area when engine temperature is above a predetermined value.

4,231,337
AIR INTAKE SYSTEM FOR DIESEL ENGINE

Akiyasu Kuwahara, and Syozo Yanagisawa, both of Ibaraki, Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 25, 1979, Ser. No. 33,270
Claims priority, application Japan, Apr. 28, 1978, 53-49983; Jul. 14, 1978, 53-85161
Int. Cl.³ F02M *25/06*
U.S. Cl. 123—568 **17 Claims**



1. An air intake system for a Diesel engine, comprising:

a main body defining therein an air passage;

a throttle valve pivotally mounted in said air passage;

at least one EGR opening formed in the peripheral wall of said air passage for the recirculation of engine exhaust gases back into said air passage;

an EGR valve means operatively associated with said throttle valve to vary the rate of the flow of the recirculated exhaust gases through said EGR opening in accordance with the operating conditions of the engine;

said EGR opening being at least partially open by said EGR valve means when said throttle valve is in its idle position;

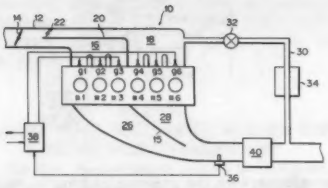
wherein the improvement comprises means for increasing the rate of the flow of intake air into said engine when the engine is at a temperature lower than a predetermined temperature.

4,231,338

INTERNAL COMBUSTION ENGINE

Fukashi Sugasawa, Yokohama, and Haruhiko Iizuka, Yokosuka, both of Japan, assignors to Nissan Motor Company, Limited, Kanagawa, Japan

Filed May 30, 1979, Ser. No. 43,123
Claims priority, application Japan, Dec. 28, 1978, 53-162547
Int. Cl.³ F02M *75/06*; F01N *3/15*
U.S. Cl. 123—568 **3 Claims**



1. An internal combustion engine comprising a plurality of cylinders split into first and second groups, said first group of cylinders held in operation independently of engine load conditions, said second group of cylinders having no supply of fuel and fresh air so as to be placed out of operation when said engine is under low load conditions, an exhaust passage connected to the exhaust ports of said first and second groups of cylinders, a sensor provided within said exhaust passage for detecting the oxygen concentration of the exhaust gases passing through said exhaust passage, control means responsive to an output of said sensor for controlling the air/fuel ratio of a mixture produced in each cylinder to an optimum value, an exhaust gas purifier provided in said exhaust passage for purifying the exhaust gases passing through said exhaust passage, an exhaust gas recirculation passage having its one end connected to the intake passage of said second group of cylinders and the other end connected to said exhaust passage in arrear of said exhaust gas purifier, and valve means provided in said EGR passage which is open to allow recirculation of exhaust gases through said EGR passage when said engine is under low load conditions.

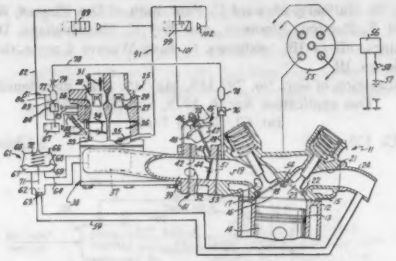
4,231,339

CONTROL DEVICE FOR EXHAUST GAS RECYCLED INTERNAL COMBUSTION ENGINE

Hiromitsu Matsumoto, Hamatsu, and Keiichi Sugiyama, Shizuoka, both of Japan, assignors to Yamaha Hatsukoko Kabushiki Kaisha, Iwata, Japan

Filed Jun. 15, 1979, Ser. No. 48,746
Claims priority, application Japan, Jun. 16, 1978, 53-72960
Int. Cl.³ F02M *25/06*
U.S. Cl. 123—568 **10 Claims**

1. In an internal combustion engine having a variable volume chamber in which combustion occurs, a main intake passage communicating with said chamber through a main intake port for delivering a charge thereto, an auxiliary intake passage communicating with said chamber through an auxiliary intake port, said auxiliary intake passage having an effective cross-sectional area substantially less than the effective cross-section area of said main intake passage for causing a given mass flow of charge through said auxiliary intake port to enter said chamber at a significantly greater velocity, an emission system for discharging a gas for further treatment by combustion within said chamber, valve means for controlling the ratio of communication of said auxiliary and main intake passages with said chambers during a given cycle of operation, and conduit means for delivering the gases from said emission system to said chamber, the improvement comprising means for precluding flow of said emission system gases to said chamber when a



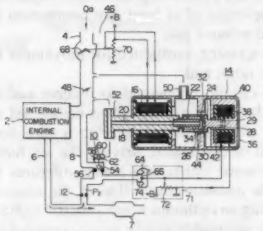
substantial portion of the chamber charge is being supplied by said main intake passage.

4,231,340

EXHAUST GAS RECIRCULATION CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE

Torazo Nishimiya, Mito; Masamitsu Okumura, Katsuta; Tomo Ito, Katsuta, and Seisaku Numakura, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jun. 20, 1979, Ser. No. 50,451
Claims priority, application Japan, Jun. 20, 1978, 53-74664
Int. Cl.³ F02M *25/06*
U.S. Cl. 123—568 **8 Claims**



1. An exhaust gas recirculation control system of an internal combustion engine comprising:

a core formed therein with a hollow passage opened at its end;

a plunger made of a magnetic material and being movable in the axial direction of said core, said plunger having a valve seat opposing the open end of said core;

a spring biasing said plunger to bring a valve portion comprised of said open end and said valve seat into an open state;

a first exciting coil applying a force to said plunger to move said plunger in the closing direction in opposition to the bias of said spring;

a second exciting coil applying to said plunger a force substantially opposite to the force which said first exciting coil applies to said plunger;

a housing defining a chamber which incorporates said valve portion;

at least one opening formed in said housing and being in communication with a portion at a pressure substantially equal to external atmospheric pressure;

a flow-electricity transducer generating an electric signal depending on the amount of inlet air of the internal combustion engine and applying said electric signal to said first exciting coil;

means for communicating the hollow passage of said core to the downstream of a throttle valve;

an exhaust gas recirculation passage passing recirculation of partial exhaust gas of the internal combustion engine into a mixture introduced into said internal combustion engine;

a control valve disposed in said exhaust gas recirculation passage, for controlling the amount of exhaust gas recirculation in response to a negative pressure in the hollow passage of said core;

an orifice disposed in said exhaust gas recirculation passage, for generating a negative pressure at the upstream of said control valve; and

a pressure-electricity transducer generating an electric signal in inverse proportion to the pressure downstream of said orifice and applying said electric signal to said second exciting coil.

4,231,341

EXHAUST GAS FLOW CONTROL VALVE APPARATUS FOR USE IN AN INTERNAL COMBUSTION ENGINE

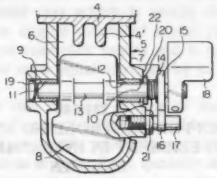
Akio Kuramoto, Okazaki, and Toshinari Onishi, Toyota, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Jun. 21, 1978, Ser. No. 917,654

Claims priority, application Japan, May 12, 1978, 53/55684

Int. Cl.³ F02M *31/00*; F16K *5/00*

U.S. Cl. 123—552 **13 Claims**



1. An exhaust gas flow control valve device in combination with an internal combustion engine having an exhaust housing defining an exhaust passage therein, said device including a rotary shaft extending across the exhaust passage and rotatably inserted into holes formed in opposing walls of the exhaust housing, said rotary shaft having an end portion projecting from one of said opposing walls of the exhaust housing; a valve mounted on said shaft in the exhaust passage for controlling the flow of exhaust gas; and means for rotating said shaft in accordance with change in operating condition of the engine, wherein the improvement comprises:

sealing means sealingly surrounding sahd shaft at a position near the projecting end portion of said shaft adjacent said one wall of the exhaust housing and

resilient means for urging said sealing means against the adjacent wall of the exhaust housing for establishing sealing contact between said sealing means and said wall of the housing.

4,231,342

DIESEL FUEL HEAT RECOVERY SYSTEM AND CONTROL VALVE THEREFOR

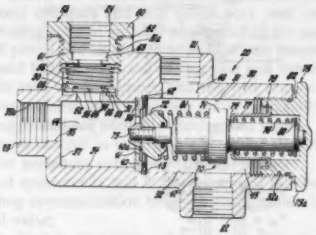
William J. Johnston, Burton, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 29, 1979, Ser. No. 7,474

Int. Cl.³ F02M *53/00*; F16K *24/02*

U.S. Cl. 123—557 **3 Claims**

1. A temperature responsive fuel flow control valve for use in a diesel engine fuel system of the type having a fuel tank connected by a supply conduit and a fuel filter to the inlet of a fuel pump used to supply fuel to a plurality of fuel injectors mounted on the engine, the injectors being connected to a fuel return conduit whereby excess fuel supplied to the injectors and heated by the engine is returned to the fuel tank, said flow control valve including a housing defining a fuel return chamber and a mixing chamber interconnected by a port passage, said housing having an inlet passage opening at one end into said mixing chamber and connectable at its opposite end to the supply conduit intermediate the ends thereof with the fuel tank downstream thereof whereby fuel from the fuel tank can flow into said mixing chamber; a fuel supply passage in said housing opening at one end into said mixing chamber and being connectable at its opposite end to the supply conduit intermediate the ends thereof with the fuel filter upstream thereof; said housing further having a fuel return passage opening into said fuel return chamber and a discharge passage from said fuel return chamber, said fuel return passage being connectable to the return conduit whereby excess fuel being returned from the



injectors will flow into said fuel return chamber, said fuel return discharge passage being connectable to the fuel tank for the discharge of fuel thereto; a spring biased, pressure responsive valve, with a vapor vent passage therethrough, operatively positioned in said fuel return discharge passage and in continuous communication with the fuel in the fuel return chamber for controlling the pressure of fuel in said chamber, and a thermostat valve positioned in said mixing chamber in heat exchange relationship with the fuel therein for controlling flow of fuel from said fuel return chamber through said port passage into said mixing chamber as a function of the temperature of the fuel in said mixing chamber.

4,231,343

DEVICE FOR CONTROLLING THE INTAKE AIR TEMPERATURE OF A CARBURETOR-EQUIPPED INTERNAL COMBUSTION ENGINE

Herbert Alf, Ludwigsburg; Volker Ernst, Sachsenheim; Rudi Hainle, Ludwigsburg, and Rudolf Leipelt, Oberstenfeld, all of Fed. Rep. of Germany, assignors to Filterwerke Mann & Hummel GmbH, Ludwigsburg, Fed. Rep. of Germany

Filed Apr. 17, 1979, Ser. No. 30,897

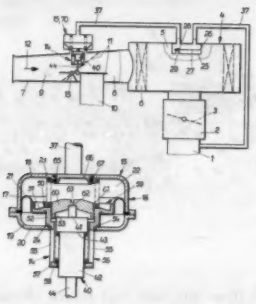
Claims priority, application Fed. Rep. of Germany, Apr. 18, 1978, 2816727

Int. Cl.³ F02M *31/00*

U.S. Cl. 123—556 **7 Claims**

1. A device for controlling the intake air temperature of an internal combustion engine equipped with a carburetor in its air intake system and an air filter upstream of the carburetor; the device including a raw air mixing duct leading into the air filter from an intake duct junction formed by a cold air intake duct through which is taken in raw air of ambient temperature and a warm air intake duct through which is taken in preheated raw air coming from an exhaust stove, for example; the device further including: valve means associated with said intake duct junction for adjusting the relative flows of raw air through said cold air intake duct and warm air intake duct by progressively opening one duct while at the same time closing the other duct, a pneumatic valve actuator with an actuator return spring, a drive connection between the valve means and the moving member of said valve actuator, a vacuum line leading from a point downstream of the carburetor to said valve actuator and so connected to it that the negative pressure in the vacuum line displaces said moving actuator member against the actuator return spring, in the sense of opening the warm air intake duct

closing the cold air intake duct, and, in said vacuum line, a thermostat-controlled relief valve arranged at a location where its thermostatically sensitive element is exposed to the temperature of the air flow downstream of the intake duct junction and responds to a temperature increase by progressively opening a relief port in the vacuum line to lower the negative pressure therein and to reset the valve means in the direction of closing the warm air intake duct; and the device still further including abutment means in the drive connection between said valve actuator member and the valve means, for limiting the return movement of the actuator member and drive connection, and a longitudinally expanding and contracting wax



thermostat exposed to the raw air of ambient temperature and forming a portion of said drive connection, whereby an ambient temperature level below a predetermined value causes the wax thermostat to contract to such an extent that the fully returned actuator member and drive connection, as positioned by said abutment means, maintains the valve means in a position in which the warm air intake duct remains partially opened; the improvement in said device comprising:

an adjustable threaded connection between the moving member of the pneumatic valve actuator and the wax thermostat, which connection makes it possible to permanently increase or decrease the effective length of the drive connection.

4,231,344

AIR INDUCTION SYSTEMS FOR DIESEL ENGINES

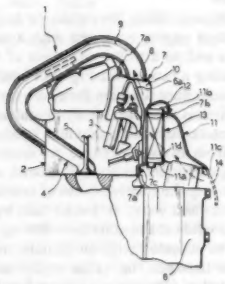
Mario Urbinati, and Luigi Conti, both of Turin, Italy, assignors to Centro Ricerche Fiat S.p.A., Turin, Italy

Filed Jan. 11, 1979, Ser. No. 2,641

Claims priority, application Italy, Jan. 20, 1978, 67105 A/78

Int. Cl.³ F02M *61/14;* F02F *7/00;* F02B *77/02*

U.S. Cl. 123—518 **5 Claims**



1. In an internal combustion engine having compression ignition and comprising:

at least one cylinder,

at least one fuel injector, said at least one cylinder having a respective said fuel injector,

at least one air induction duct defined by a respective said at least one cylinder,

a fuel pump located adjacent said engine, and

at least one fuel pipe connecting said fuel pump with a respective said fuel injector, an air induction system comprising:

baffle means fixed to said engine to cover said fuel pump, said fuel injectors and said associated fuel pipes, whereby the air inducted by said engine is caused to flow over said components, said baffle means defining an internal space,

an air filter located in said internal space upstream of said fuel injectors and said fuel pipes, whereby the air inducted by said engine passes through said filter prior to passing over said fuel injectors and said fuel pipes, and

at least one pipe for conducting filtered air from said space into the air induction duct of a respective said cylinder, said at least one pipe being located above said engine.

4,231,345

APPARATUS FOR CONTROLLING AN ELECTRICAL SWITCHING ELEMENT IN INTERNAL COMBUSTION ENGINES

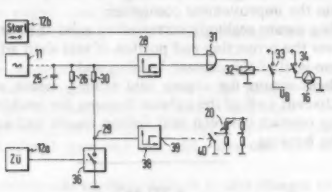
Ulrich Drews, Vaihingen-Pulverdingen; Hans Schnürle, Walheim; Michael Horbelt, Schwieberdingen; Bernhard Schmidt, Leonberg, and Peter Werner, Wiernsheim, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 27, 1979, Ser. No. 24,489

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1979, 2815780

Int. Cl.³ F02M *37/08*

U.S. Cl. 123—510 **7 Claims**



1. In an internal combustion engine having a fuel supply system, the combination of apparatus for controlling at least one electrical switching unit such as the main relay of the voltage supply and of the fuel pump control circuit in accordance with one operational characteristic and with a position of a switch such as an ignition switch indicating an operating condition, comprising a storage device for receiving a value of a signal related to a charging and discharging process, means for feeding a signal depending on one engine operational characteristic to said storage device, means for modifying at least one of the charging and discharging process determined by the switch position of the ignition switch for the engine, and means for utilizing the value of the signal stored in said storage device for controlling said electrical switching unit.

4,231,346
CONTROL ARRANGEMENT FOR A SUPERCHARGED DIESEL ENGINE

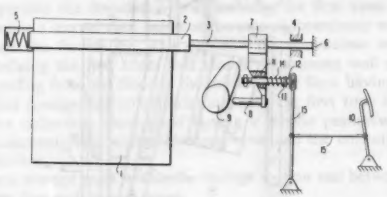
Gerhard Fränkle, Remshalden-Grunbach, and Dieter Woschee, Esslingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 30, 1977, Ser. No. 865,873

Claims priority, application Fed. Rep. of Germany, Dec. 30, 1976, 2659498

Int. Cl.³ F02D 1/04

U.S. Cl. 123—457 **4 Claims**



1. A control arrangement for an internal combustion engine, the control arrangement comprising:

injection pump means having a slidable control rack;

full-load abutment means, said abutment means including a three-dimensional cam which is axially displaceable in response to an engine rotational signal provided by a rotational speed controller means and is rotatable in response to an air mass signal provided by an air mass measuring means;

characterized in that there is a support member fixedly attached to said control rack, a movable gas lever connected to linkage means operably associated with said control rack so as to control the quantity of fuel injected into said engine, cam-engaging means attached to said support member for engaging said three-dimensional cam in a direction corresponding to an increase in said quantity of fuel injected so as to prevent further movement of said control rack, and overload means for forming a yieldable connection between said support member and said linkage means, and in that said overload means permits relative movement between said linkage means and said support member when said cam-engaging means is in engagement with said three-dimensional cam during further movement of said gas lever, thus preventing any further sliding of said control rack.

4,231,347
FUEL PRESSURE REGULATING VALVE

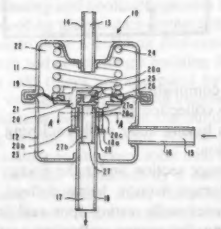
Takeharu Ohumi, Toyota, and Masaru Tsunekawa, Fujioka, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Dec. 19, 1978, Ser. No. 970,931

Claims priority, application Japan, Dec. 19, 1977, 52/170996

Int. Cl.³ F02D 1/04

U.S. Cl. 123—512 **2 Claims**



1. A fuel pressure-regulating valve for an electronic fuel injection system of an internal combustion engine having an induction passage, a fuel supply line and a fuel return line, the valve comprising:

a body member having a pressure port for connection to the engine induction passage, an inlet port for connection to the fuel supply line, and an outlet port for connection to the fuel return line;

a flexible diaphragm for dividing the interior of said body member into a first chamber communicating with said pressure port and a second chamber communicating with said inlet port;

a piston secured to said diaphragm and having a hollow stem extending into said second chamber;

valve means for controlling communication between said second chamber and said outlet port, said valve means including a valve member responsive to the movement of said piston and an elongated hollow seat member located in said hollow stem and having one end forming a valve with said valve member and the end remote from said valve member secured to said outlet port, said diaphragm being biased for normally closing said valve;

a bushing secured in said hollow stem and slidable upon the outer periphery surface of said seat member;

aligned apertures in said hollow stem and said bushing providing communication between said second chamber and said valve;

said bushing having flattened portions in its outer periphery surface adjacent the apertures therein, thereby forming gaps between said hollow stem and said bushing for preventing reduction in communication through said aligned apertures by a small rotational displacement of said bushing with respect to said hollow stem.

4,231,348
IGNITION SYSTEM WITH IGNITION CURRENT AND MINIMUM SPARK DURATION CONTROLS

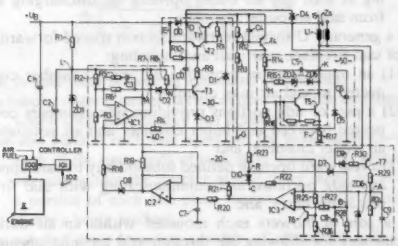
Werner Schiele, Ludwigsburg, and Richard Schleupen, Ingersheim, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 27, 1978, Ser. No. 973,598

Claims priority, application Fed. Rep. of Germany, Dec. 31, 1977, 2759153

Int. Cl.³ F02P 3/04

U.S. Cl. 123—644 **13 Claims**



1. In an ignition system having ignition coil means (Zs), means (T5) for producing an ignition current in said ignition coil means, and means connected to said ignition coil means for producing a spark upon interruption of said ignition current in said ignition coil means:

apparatus for controlling said ignition current to produce a spark having a predetermined desired spark duration comprising

current control means (40,T1) connected to said ignition coil means for controlling said ignition current in correspondence to a current control signal applied thereto;

means (C8, R28) for furnishing a desired spark duration signal corresponding to said predetermined desired spark duration;

means (T7) connected to said ignition coil means for furnishing an actual spark duration signal corresponding to the actual duration of said spark produced by said spark producing means;

means (IC3) connected to said desired spark duration signal furnishing means and said actual spark duration signal furnishing means for furnishing an error signal corresponding to the difference therebetween;

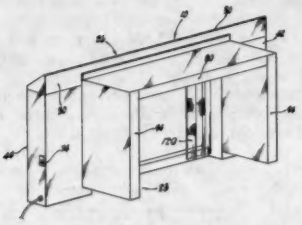
and connecting means (R20, C7, IC2) for applying said error signal to said current control means to change said current control signal in a direction for controlling said ignition current to change said actual spark duration in a direction decreasing said error signal.

4,231,349

FIREPLACE HEAT EXCHANGER UNIT

Keith Livesay, Rte. 2, Salem, Ill. 62881

Filed Nov. 13, 1978, Ser. No. 959,786
Int. Cl.³ F24B *7/04*
U.S. Cl. 126—121 **9 Claims**



1. A fireplace heat exchanger unit for a fireplace providing a heat source and having opposed sidewalls, front and rear walls, a bottom wall, and an upper flue entry, said unit comprising:

(a) a forward section including:

(1) an upper, generally elongate horizontal portion providing an air inlet chamber having at least one air inlet opening for admitting air into said air inlet chamber, and

(2) a pair of lower, generally vertical portions spaced lengthwise of and operatively attached to said upper portion and each providing an air outlet chamber having at least one air outlet opening for discharging air from said air outlet chamber,

(b) a generally U-shaped rearward section spaced forwardly of said fireplace rear wall and including:

(1) an upper portion providing an upper chamber connected to said air inlet chamber,

(2) a pair of side portions providing side chambers connected between said upper chamber and an associated air outlet chamber, and

(3) a rearward opening defined substantially by said upper and side portions, and communicating with said fireplace flue entry, and

(c) a pair of blowers each mounted within an air outlet chamber for drawing air through said air inlet opening and into said air inlet chamber, through said upper and side chambers and into the air outlet chambers for discharge through said air outlet openings.

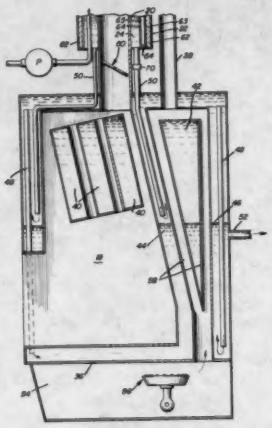
4,231,350

HOT WATER BOILER

Dean E. Marsh, 512 N. 4th St., Belen, N. Mex. 87002

Filed Jul. 20, 1978, Ser. No. 926,401
Int. Cl.³ F24B *9/04;* **F22B** *33/02*
U.S. Cl. 126—133 **3 Claims**

1. A liquid heating device comprising a combustion chamber, an exhaust stack extending upwardly from the combustion chamber and receiving combustion products from said combustion chamber, a liquid jacket associated with the combustion chamber in heat exchange relation thereto, a liquid jacket associated with the stack in heat exchange relation thereto, said liquid jacket associated with the combustion chamber including a horizontal partition defining upper and lower liquid reservoirs, a heated liquid outlet at an upper portion of the lower reservoir, a cold liquid inlet at an upper portion of the jacket associated with the stack, connecting tubes extending



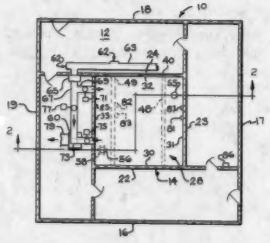
between and communicating a lower end of the jacket associated with the stack and a lower portion of the upper reservoir, and vertically elongated flow tubes extending between and communicating an upper portion of the upper reservoir and a lower portion of the lower reservoir whereby the liquid is heated in three vertically oriented stages from the inlet to the outlet.

4,231,351

METHOD AND APPARATUS FOR SOLAR HEATING A BUILDING

David R. Pheils, Jr., 5814 Rye Mill Ct., Toledo, Ohio 43611

Continuation of Ser. No. 788,115, Apr. 8, 1977, abandoned. This application Jun. 25, 1979, Ser. No. 51,385
Int. Cl.³ F24J *3/02*
U.S. Cl. 126—419 **6 Claims**



3. A building comprising:

a solar energy collection section;

a main section having inner walls enclosing the energy collection section;

an energy storage section under the energy collection section, the storage section being defined by foundation walls, said inner walls resting upon said foundation walls;

a roof covering the energy collection section adapted to permit the passage of solar energy therethrough to heat

the energy collection section, said roof being attached at and resting upon said inner walls;

a floor spaced from the roof to separate the storage section from the collection section;

a subfloor spaced from and below said floor contiguous with the foundation walls to further define the energy storage section;

a first foraminous wall spaced from one of said foundation walls extending from the floor to the subfloor to define a first zone between the first foraminous wall and such foundation wall;

a second foraminous wall spaced from the foundation wall opposite the foundation wall defining the first zone to define a second zone between the second foraminous wall and the foundation wall opposite the foundation wall defining the first zone, said second foraminous wall extending from the floor to the subfloor, the floor having a first passageway communicating with the first zone and the collection section and having a second passageway communicating with the second zone and the collection section;

a heat storage mass within the storage section and between the first and second zones;

means for selectively moving air within the energy collection section through the heat storage mass and back to the energy collection section, the first and second zones and foraminous walls cooperating to distribute such moving air throughout the heat storage mass;

an alternate heat source for supplying heated air to said main section; and

means for controlling the air flow in the building such that the air from the main section can be moved through the courtyard in a mixing relationship with the air therein before being heated by said alternate heat source.

4,231,352

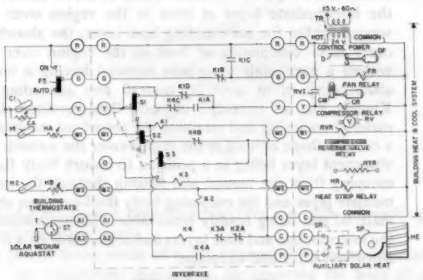
INTERFACE CIRCUIT FOR ADDING SOLAR HEAT TO A BUILDING HEATING AND COOLING SYSTEM

Donald R. Bowden, and Robert O. Sparks, both of Huntsville, Ala., assignors to Solar Unlimited, Inc., Huntsville, Ala.

Filed Jul. 5, 1979, Ser. No. 55,127

Int. Cl.[3] F24J *3/02*; G05D *23/00*

U.S. Cl. 126—422 **3 Claims**



1. In building heating and cooling apparatus including building heating and cooling thermostats connected through terminals to relays controlling a building fuel-consuming heating and cooling system and controlling a building duct air circulating fan wherein said relays are energized by power from a building control voltage transformer, an interface control to be interposed at said terminals between the building thermostats and the building heating and cooling system relays for introducing and controlling an auxiliary solar heat system having a thermal storage medium circulated by a pump into heat exchange relationship with said duct, the temperature of the medium being measured by an aquastat including a heat-responsive switch, said interface comprising:

an electrical circuit having thermostat and heating and cooling and fan terminals corresponding with and interposed between the terminals of the building thermostats and of the building heating and cooling and fan system, and the circuit additionally having solar system aquastat and pump terminals;

first relay means in the electrical circuit having contacts operative upon closing of a building heating thermostat to deliver power to the building heating system and to the aquastat switch;

solar system relay means responsive to power delivered to the aquastat switch when closed and having contacts operative to interrupt power through the first relay contacts to the building heating system and operative to deliver power to the solar system circulation pump;

means to energize the air circulation fan of the building when a thermostat is closed; and

third relay means operative when a building cooling system thermostat is closed and having contacts connected to interrupt the solar system relay means and prevent it from energizing the solar system circulation pump.

4,231,353

SOLAR HEAT COLLECTING APPARATUS

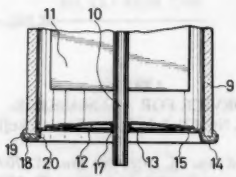
Keiichi Kanatani, Kirakata; Masato Osumi, Osaka, and Hajime Hayama, Nara, all of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed May 10, 1978, Ser. No. 904,412

Claims priority, application Japan, May 13, 1977, 52-62380[U]; Jun. 20, 1977, 52-81370[U]

Int. Cl.[3] F24J *3/02*

U.S. Cl. 126—443 **8 Claims**



1. A solar heat collecting apparatus comprising:

a tubular outer member having at least one open end through which solar heat energy can penetrate,

an end plate at each said open end for hermetically sealing each of the open ends of said outer member to provide a vacuum within the interior of said outer member, at least a portion of each end plate disposed inwardly of its periphery being resilient,

a tubular inner member capable of absorbing solar heat energy disposed in said outer member, the ends of said inner member hermetically projecting from said end plates, the interior of said inner member acting as a passage for a heating medium, and

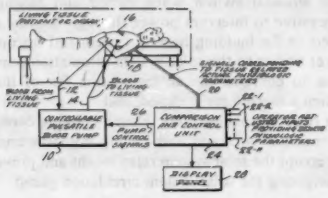
an annular groove formed at the periphery of each of said end plates, defined by opposed inner and outer peripheral walls, each of said open ends of said outer member hermetically joined within an annular groove of a respective end plate by means of an initially flowable sealing substance within said groove, the height of said outer peripheral wall being lower than the height of the inner peripheral wall, the sealing substance extending no higher than said outer pheripheral wall and being always below the level of said inner peripheral wall.

4,231,354

PULSATILE BLOOD PUMPING APPARATUS AND METHOD

Robert J. Kurtz, Cliffside Park, N.J., and Spencer J. Silverstein, Ithaca, N.Y., assignors to Howmedica, Incorporated, New York, N.Y.

Filed Jul. 14, 1978, Ser. No. 924,567
Int. Cl.³ A61M *1/03*; A61F *1/24*
U.S. Cl. 128—1 D **24 Claims**



1. A pulsatile fluid pumping system for circulating blood or blood-like fluids within the vascular systems of living tissue under automatically controlled and predetermined plural physiologic parameters, said system comprising:

a pulsatile pump adapted for connection to said living tissue and having plural pumping parameters which may be independently controlled during cyclic operation of the pump, and

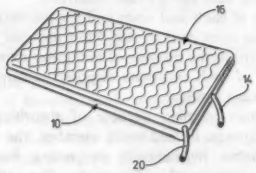
sensing and control means for simultaneously monitoring plural predetermined physiologic parameters of said living tissue and for simultaneously controlling the plural independent pumping parameters as a predetermined logical function of said plural physiologic parameters so as to substantially maintain all such physiologic parameters at respectively corresponding predetermined values.

4,231,355

DEVICE FOR AIR-MASSAGE

Katsumasa Hara, No. 121-1, 1-chome, Kamishakujii, Nerima-ku, Tokyo, Japan

Filed Sep. 15, 1978, Ser. No. 942,709
Claims priority, application Japan, Sep. 29, 1977, 52-117102
Int. Cl.³ A61H *7/00*
U.S. Cl. 128—24.2 **8 Claims**



1. Apparatus for air massage comprising a plurality of distinct air inflatable bags arranged in parallel alignment with each other, each having its own port for feeding and exhausting air and at least one elastic element attached to one surface of at least a portion of a number of inflatable bags, said elastic element comprising an elastic sheet provided with a plurality of independent air filled projections on the surface adapted to contact with a body part, said air inflatable bags being independently inflated and deflated relative to each other in a time difference so as to move said elastic element in a wavy manner.

4,231,356

SURGICAL IMMOBILIZING BANDAGE AND THE LIKE

Koji Usukura, Kasukabe, Japan, assignor to Tokyo Eizai Lab. Co., Ltd., Tokyo, Japan

Filed Oct. 25, 1978, Ser. No. 954,467
Claims priority, application Japan, Nov. 17, 1977, 52-138244
Int. Cl.³ A61F *13/04*
U.S. Cl. 128—90 **7 Claims**

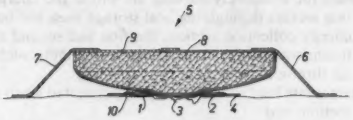
1. A surgical immobilizing bandage and the like comprising an elastic fabric impregnated with a composition the main constituent of which consists of an aliphatic polyester polymer or a mixture of aliphatic polyester polymers which are synthesized from aliphatic diols and saturated dicarboxylic acids.

4,231,357

BANDAGE FOR ABSORBING BODY FLUIDS

Hans Hessner, Djursholm, Sweden, assignor to Mo Och Domsjo Aktiebolag, Ornskoldsvik, Sweden

Filed Dec. 4, 1978, Ser. No. 965,761
Claims priority, application Sweden, Dec. 8, 1977, 7713918
Int. Cl.³ A61L *15/00*
U.S. Cl. 128—156 **12 Claims**



1. A body fluid absorbent bandage for open and weeping body wounds, comprising, in combination;

(1) at least two bandage-supporting base layer pieces for juxtaposed attachment to the body about substantially the entire periphery of the wound or injury, and surrounding it, but without covering over the wound or encroaching upon the wound, thus leaving the wound open and exposed;

(2) an intermediate foraminous sheet for attachment to the base layer as an intermediate layer extending across and bridging the wound; and

(3) an absorbent outer layer for removable attachment to the intermediate layer in a manner to extend across and cover the intermediate layer at least in the region over the wound within the surrounding base layer, the absorbent outer layer comprising at least in the region over the wound a particulate absorbent material having a water absorptivity of at least 50 mm/10 min according to Klemm, and an envelope of body fluid-pervious sheet material enclosing and retaining the absorbent material in a convex shape at least in the region over the wound, the absorbent layer being in a position to absorb body fluids escaping from the wound and passing through the intermediate layer and the enclosing body fluid-pervious sheet material and being readily removable without disturbing the intermediate and base layers and replaceable by a fresh absorbent layer and envelope.

4,231,358

SURGICAL DRESSING

Cheryle M. Atchison, 2629 N. Fruitdale Ave., Indianapolis, Ind. 46224

Continuation of Ser. No. 731,042, Oct. 8, 1976, abandoned. This application Nov. 9, 1978, Ser. No. 959,319
Int. Cl.³ A61F *13/00*
U.S. Cl. 128—168 **4 Claims**

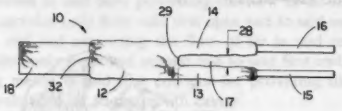
1. An article of manufacture for positioning in the perineal area of a person which comprises:

a pad including a layer of absorbent material integral with the pad and sized to fit within the perineal area of the person, said pad having a front end and a rear end;

a support member having a first end integrally connected to

the rear end of said pad and further having a second end; and

a pair of straps, each strap having a first end and a second end, the first ends being integrally connected to the front end of said pad at spaced apart locations, the front end of



said pad and said straps defining an opening for permitting passage therethrough of male external genitalia, each of said straps including a first portion adjacent the first end, each of the first portions of said straps including a layer of absorbent material integral with the layer of absorbent material of said pad.

4,231,359

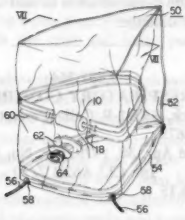
PERSONAL EMERGENCY BREATHING HOOD WITH NOSE BLOCKING DEVICE

Frank E. Martin, Chester, Md., assignor to Midori Anzen Company, Ltd., Tokyo, Japan

Division of Ser. No. 828,164, Aug. 23, 1977, abandoned. This application Nov. 7, 1978, Ser. No. 958,445

Int. Cl.³ A62B 7/00

U.S. Cl. 128—201.18 **3 Claims**



1. An emergency breathing hood for use with a breathing apparatus, comprising:

a plastic hood made of a gas-impermeable, flame-resistant and transparent plastic film for covering the head of a wearer and including means for substantially sealing the hood around the neck of a wearer;

a mouthpiece secured to and extending through said plastic hood, for providing a connection between the wearer's mouth and the breathing apparatus; and

a nose blocking device for blocking the gas inflow into the nostrils and inhibiting outflow from the nostrils of the user, said nose blocking device comprising a cylindrically shaped device supported within said hood so that said cylindrically shaped device is positioned in front of and in contact with the wearer's nostrils when said hood is worn, and a thin elastic material over said cylindrically shaped device and extending over an area effective for covering the wearer's nostrils.

4,231,360

NOSE CLIP FOR RESPIRATORS

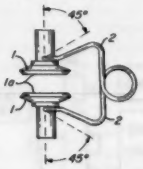
Stefan Zloczysti, and Bernd Woike, both of Berlin, Fed. Rep. of Germany, assignors to Auergesellschaft GmbH, Berlin, Fed. Rep. of Germany

Filed Mar. 2, 1979, Ser. No. 16,898

Claims priority, application Fed. Rep. of Germany, Jun. 19, 1978, 2826620

Int. Cl.³ B63C 11/02

U.S. Cl. 128—201.18 **2 Claims**



1. A nose clip for respirators, comprising two pads and a spring clip connecting them together for pressing them against the sides of a wearer's nose when the nose clip is worn, end portions of the spring clip being straight and disposed in parallel relation substantially perpendicular to the plane of the clip, and said pads being provided with transverse holes pivotally receiving said end portions, said holes being located a short distance from the nose-engaging faces of the pads, the connection between the spring and pads permitting the pads to freely tilt relative to the spring clip.

4,231,361

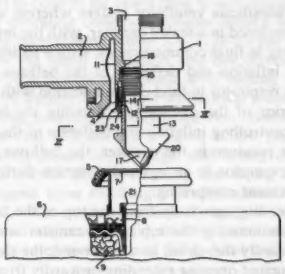
BREATHING APPARATUS FLOW DEVICE

Layton A. Wise, Washington, Pa., assignor to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed Jan. 19, 1979, Ser. No. 4,659

Int. Cl.³ A62B 7/00

U.S. Cl. 128—202.26 **4 Claims**



1. A flow device for connecting a face piece and a breathing bag with a chemical canister having an upwardly extending neck closed by a sealing disk and also having a center tube extending downwardly in the canister from the neck, said flow device comprising a hollow housing provided with a top wall and a bottom opening that is encircled by a wall, means adapted to engage the upper end of said neck, the side of the housing having an opening therein for connection to a breathing bag, rigid tubular means in said housing extending through said top wall and joined thereto and having upper and lower ends, said upper end extending above said housing and having means for connection to an exhalation tube, said lower end being spaced inwardly from the side of said housing, a hollow plunger slidably mounted in said tubular means and extending down below the housing, means limiting downward movement

of the plunger, coil spring means resisting upward movement of the plunger, the plunger having an open upper end and a perforated and pointed lower end for piercing said sealing disk when the hollow housing is pressed down on said neck, and a cylindrical resilient seal encircling the lower portion of said tubular means in tight engagement therewith and extending below it, the lower end of the seal below said tubular means being in the form of a bead extending inwardly into engagement with the plunger, whereby the space between the plunger and said tubular means is sealed against flow of air therethrough.

4,231,362

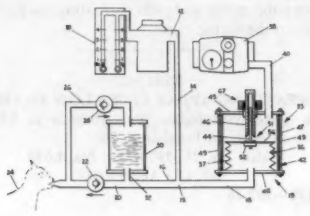
ANESTHESIA VENTILATION SYSTEM

Robert M. Pearson, 11685 Spicer Dr., Plymouth, Mich. 48170, and A. Edwin Weninger, Los Alamitos, Calif., assignors to Robert M. Pearson, Plymouth, Mich.

Filed Oct. 2, 1978, Ser. No. 947,946

Int. Cl.³ A61M *16/00*

U.S. Cl. 128—205.15 **11 Claims**



1. In an anesthesia ventilator system wherein an inflatable bellows is enclosed in a sealed canister, with the interior of the bellows being in fluid communication with a patient breathing circuit and inflation and deflation of the bellows being controlled by a respirator in fluid communication with the portion of the interior of the canister surrounding the bellows, the respirator controlling inflation and deflation of the bellows by varying the pressure in the canister, the bellows being positioned for expansion in an upward direction during inflation, the improvement comprising:

a rod extending upwardly from the top of the bellows;

a sleeve mounted in the top of the canister and extending downwardly therefrom to a lower end, the sleeve having an elongated opening extending upwardly from the lower end, the opening being formed and positioned such that it mates with the rod on the bellows and constrains the rod to vertical movement as the bellows expands and contracts upwardly and downwardly, the sleeve including a valve actuating portion at the lower end; and

valve means mounted in an opening in the upper surface of the bellows for permitting gas flow between the interior of the canister and the interior of the bellows, said valve means being resiliently biased in a normally closed position so as to block gas flow out of the bellows through said opening, the valve means being positioned for engagement with the valve actuating portion of the sleeve and being openable by engagement therewith after the bellows has expanded upwardly a predetermined distance, the opening of the valve means serving to relieve the internal gas pressure in the bellows.

4,231,363

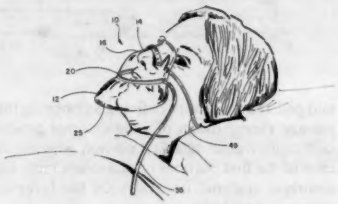
GAS DELIVERY FACE SHIELD

Jerry L. Grimes, Star Rte., Box 517, Lytle Creek, Calif. 92358

Continuation-in-part of Ser. No. 737,851, Nov. 1, 1976, abandoned. This application Jan. 8, 1979, Ser. No. 1,686

Int. Cl.³ A61M *16/00*

U.S. Cl. 128—205.25 **9 Claims**



1. A device for delivering oxygen to a patient during respiratory therapy comprising:

a unitary, shape retaining shell member adapted to overlie a patient's nose and mouth,

a gas delivery member extending across the shell member interior and dividing said shell member into an upper portion and a lower portion, said upper portion having a peripheral surface adapted to provide a substantially gas tight seal with the patient's nose bridge and cheeks, said lower portion having a lower edge spaced outwardly thereby providing a lower opening between said mask lower edge and the patient's face, said upper and lower portions being arched outwardly from said gas delivery member and thereby in relation to the patient's face and forming an enlarged upper and lower chamber, respectively, said gas delivery member having a plurality of orifices directed into said upper chamber for directing oxygen thereto, whereby oxygen delivered to said device through said gas delivery member results in substantially greater oxygen concentration in said upper chamber than in said lower chamber.

4,231,364

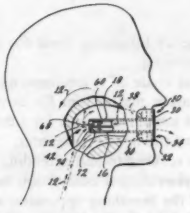
RESPIRATORY CONTROL

Fred R. Speshyock, 33091-R Calle Perfecto, San Juan Capistrano, Calif. 92675

Filed Apr. 30, 1979, Ser. No. 34,649

Int. Cl.³ A62B *7/10*

U.S. Cl. 128—206.15 **18 Claims**



1. A respiratory control for use in the mouth cavity for controlled breathing comprising, means defining a mouthpiece adapted to be inserted inside the mouth cavity and having a bore extending therethrough with first and second open ends, said bore being tapered from said first open end to said second open end, said first open end adapted to be located near the entrance to the mouth cavity and said second open end being

adapted to be located in the back or throat portion of the mouth cavity,

means defining first and second air corridors between said first and second open ends, said first corridor for the flow of air during inhalation and said second corridor for the flow of air during exhalation,

valve means in said bore permitting the flow of air in said first corridor only from said first open end to said second open end and permitting the flow of air in said second corridor only from said second end to said first end, and

filtering means in said first corridor for providing filtered and enhanced air to the mouth cavity.

4,231,365

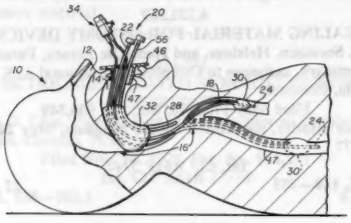
EMERGENCY RESUSCITATION APPARATUS

Eugene N. Scarberry, 2834 Durban, Houston, Tex. 77043

Filed Jan. 30, 1978, Ser. No. 873,517

Int. Cl.³ A61M *16/00*

U.S. Cl. 128—207.15 **4 Claims**



1. An emergency endotracheal airway, comprising:

a first expandable member and means for inflating said first expandible member by at least human breath to a volume effectively filling a pharyngeal region adapted to continuously seal both the oral and nasal passages extending therefrom;

an endotracheal tube extending through said first expandable member and having an outer opening above said first expandable member and an inner opening below said first expandable member adapted to terminate in a trachea,

a second expandable member and means for inflating said second expandible member by at least human breath surrounding said endotracheal tube adjacent said inner opening and adapted to continuously seal against a wall portion of said trachea,

a laryngeal tube extending through said first expandable member and having an outer opening adapted to receive a supply of a selected fluid and an inner opening below said first expandable member adapted to terminate in a laryngeal region above said second expandable member; and

a stylet removably inserted through said endotracheal tube and having a predetermined curvature and one rounded end adapted to guide said inner opening of said endotracheal tube into the trachea during insertion thereof,

whereby when said endotracheal tube is properly inserted into said trachea, a patient can be ventilated by inflating said second expandible member and, if desired, said first expandable member, and administering gas to the patient's lungs via said endotracheal tube, and if said endotracheal tube is accidentially inserted into the patient's esophagus, the patient can be ventilated by inflating said first and second inflatable members and administering gas to the patient's lungs via said laryngeal tube.

4,231,366

BLOOD FLOW MONITORING AND CONTROL APPARATUS

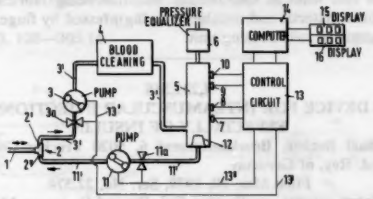
Wilfried Schael, Bad-Homburg-Dornholzhausen, Fed. Rep. of Germany, assignor to Dr. Eduard Fresenius Chemisch-Pharmazeutische Industrie KG Apparatebau KG, Bad Homburg von dur Hahe, Fed. Rep. of Germany

Filed Aug. 8, 1977, Ser. No. 822,928

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1976, 2636290

Int. Cl.³ A61M *1/03*

U.S. Cl. 128—214 E **12 Claims**



1. A blood flow monitoring and control apparatus, comprising single needle liquid withdrawal and liquid return means (1) connectable to a patient, blood treating means (4), first artery conduit means (3') connecting said blood treating means to said single needle means, artery pump means (3) in said first artery conduit means, a single operating condition volume sensing means (5) having an inlet and an outlet, second artery conduit means operatively interconnecting said blood treating means (4) to said inlet of said single operating condition volume sensing means (5), vein conduit means (11') and vein pump means (11) in said vein conduit means operatively connecting said outlet of said single operating condition volume sensing means (5) to said single needle means to form together with said first conduit means a closed loop flow circuit in which the blood circulates in but one direction, and control means (13) operatively connected to said single operating condition volume sensing means (5) as well as to said artery and vein pump means (3, 11) to control the blood flow in said closed loop flow circuit, said operating condition volume sensing means comprising filling level sensing means 7, 8, 9, 10 for the volumetric measuring of the liquid flowing in said one direction in said closed loop flow circuit, said filling level sensing means providing control signals for a liquid withdrawal phase from said volume sensing means (5) through said vein conduit and vein pump means (11, 11') and for a liquid return phase to said volume sensing means (5) through said artery conduit and artery pump means (3, 3'), whereby the liquid withdrawal phase is stopped upon reaching a predetermined first filling level in said volume sensing means (5) and the liquid return phase is started whereas a liquid return phase is stopped upon reaching a predetermined second filling level and vice versa.

4,231,367

INFUSION CATHETER ASSEMBLY

Douglas L. Rash, Orchard Park, N.Y., assignor to Viggo AB, Sweden

Filed Oct. 19, 1977, Ser. No. 843,594

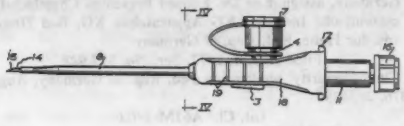
Claims priority, application Sweden, Oct. 26, 1976, 7611858

Int. Cl.² A61M *5/00*

U.S. Cl. 128—214.4 **8 Claims**

1. An infusion catheter assembly comprising a catheter unit and an insertion needle unit, said catheter unit comprising an elongated housing unit having a longitudinal passage and adapted to receive a coupling device at one end, and a flexible catheter tube, having a free end mounted to the other end of said housing in communication with said passage, said insertion needle unit comprising a head engaging said coupling end of said housing unit, a needle extending from said head through

said passage and catheter tube and protruding from said free end of said tube, and a pair of digitally grippable fins projecting from said head and extending along opposite sides of said



housing in the elongated direction and in the same direction from said head as said needle, said fins being fabricated of resilient material and capable of being pressed by finger pressure against said housing unit.

4,231,368

DEVICE FOR INTRAMUSCULAR INJECTIONS, ESPECIALLY OF INSULIN

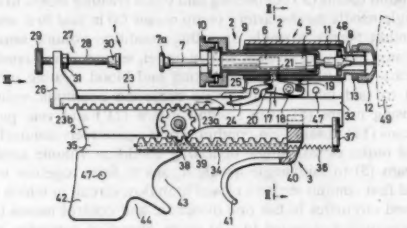
Michael Becker, Brucknerstrasse 6, 5020 Frechen-Grefrath, Fed. Rep. of Germany

Filed Mar. 20, 1979, Ser. No. 22,374

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1978, 2812729

Int. Cl.³ A61M *5/00*

U.S. Cl. 128—218 A **5 Claims**



1. A device for intramuscular injection capable of meeting the requirements of the administration of insulin, comprising a casing having a stationary grip member and, also, a guideway for displaceably mounting a syringe contained in a holder for a limited displacement in said guideway, a first spring for urging said syringe holder forward in said guideway, cocking means including an arresting pawl for releaseably holding said syringe holder against the force of said spring in a withdrawn position ready for use, and hand operable means (**3**) provided in said casing and operable by a single controllable continued interruptable movement of the same hand that holds the casing, to cause the syringe as a whole to be shot forward in response to displacement of said arresting pawl and, thereafter, to operate the syringe by bringing force to bear against the piston-rod (**7**, *7a*) thereof, said hand operable means including:

a push-rod (**23**) mounted in said casing (**2**) for longitudinal movement therein and having a front end (**23***a*) arranged for acting on said arresting pawl (**17**) for displacement thereof, and equipped at its rear end (**23***b*) with hell-mounted means (**30**) for establishing contact with and bearing directly on the rear end of said piston rod (**7**, *7a*) of said syringe (**4**) after said arresting pawl has been displaced to release said syringe, said push rod (**23**) being provided with a rack by engagement of which it may be longitudinally propelled;

a second rod (**34**) provided with a rack, mounted in said casing for movement parallel to the direction of movement of said push rod;

a rotary gear (**38**) for communicating movement between said second rod and said push rod, mounted between said rods in said casing and engaging the racks thereof;

a second spring acting on one of said rods so as to oppose forward movement of said push rod;

a pull-trigger (**41**) rigidly connected to a member of a rod system constituted by said push rod and said second rod, said pull-trigger being part of a slide mounted in said casing so as to be displaceable, with respect to the stationary grip portion (**42**) of said casing, parallel to the displacement of said rods, the displacement of said trigger being proportional to the the displacement of said piston rod of said syringe when contact is established between said push rod and said piston rod; and

a heel (**26**) on the rear end of said push-rod having an adjusting device (**27**) thereon for adjustably mounting said means (**30**) for establishing contact with the piston rod of said syringe, said adjusting device comprising a threaded spindle (**28**).

4,231,369

SEALING MATERIAL FOR OSTOMY DEVICES

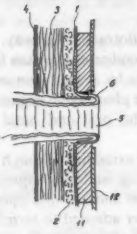
Erik L. Sorensen, Helsinge, and Hans-Ole Larsen, Farum, both of Denmark, assignors to Coloplast International A/S, Espergaerde, Denmark

Filed May 17, 1978, Ser. No. 906,549

Claims priority, application United Kingdom, May 24, 1977, 21767/77

Int. Cl.³ A61F *5/44*

U.S. Cl. 128—283 **22 Claims**



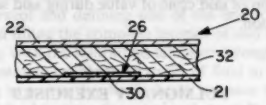
1. In an ostomy system for covering intestinal and similar stomas in a human body, comprising an ostomy device surrounding or covering said stoma and attached to the human body by sealing means, the improvement which comprises utilizing as a sealing means a shaped, gel-like composition comprising at least one physically cross-linked elastomer selected from the group consisting of styrene-olefin-styrene block copolymers and ethylene-propylene block copolymers, forming a continuous phase and at least one hydrocolloid dispersed therein, said hydrocolloid being selected from the group consisting of guar gum, pectin, sodium carboxymethyl cellulose, sodium polyacrylate, and mixtures thereof, said compositions also containing a hydrocarbon tackifier selected from the group consisting of polymers and copolymers of dicylopentadiene, alpha-pinene or beta-pinene, and wherein said gel-like composition has a low resistance to quick deformation and a rapid recovery to its original shape after deformation, whereby the seal between the ostomy device and epidermis of the human body as well as the seal between the stoma and the portion of epidermis exposable to discharge from the stoma are maintained intact, even under rapid body movement.

4,231,370

DISPOSABLE DIAPER TYPE GARMENT HAVING WETNESS INDICATOR

Judith C. Mroz, and Dennis A. Thomas, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jun. 18, 1979, Ser. No. 50,013
Int. Cl.³ A61F *13/16*
U.S. Cl. 128—287 **7 Claims**



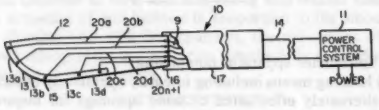
1. An improved disposable diaper type garment having a wetness indicator disposed intermediate a flexible translucent cover member and a flexible absorbent member, said improvement comprising a flexible pH-change/color-change type wetness indicator coating which is so disposed on an area of a said member that it is visible through said cover member and is in liquid communicable relation with said absorbent member, said coating comprising a solid-solid mixture of a pH-change/-color-change type material dispersed in a highly flexible matrix of adhesive material.

4,231,371

ELECTRICALLY HEATED SURGICAL CUTTING INSTRUMENT

George D. Lipp, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Nov. 16, 1978, Ser. No. 961,191
Int. Cl.³ A61B *17/38*
U.S. Cl. 128—303.1 **6 Claims**



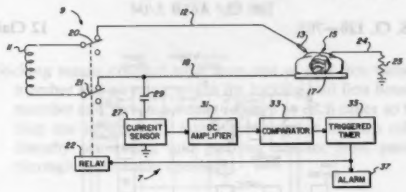
1. A surgical instrument for cutting tissue with electrical source powered means for providing simultaneous hemostasis, the instrument comprising: a substrate of electrically insulating material in the form of a blade having a cutting edge, having disposed thereon in the vicinity of the cutting edge an electrically heatable element of electrically conductive material exhibiting a resistance characteristic which varies as a function of the temperature, the element being divided into a plurality of independently heatable sections which form segments along said cutting edge by conducting an electrical current and directly heating the cutting edge therealong, and connection means providing electrical connection to each of said segments for independently supplying electrical power thereto, said connection means including n+1 connections for the heatable element wherein n is the number of segments forming segments of the heatable element; the connection means including a pair of conductors coupled to each adjacent segment at least one of which being a common power carrying conductor for an adjacent segment; test circuit means serially coupled to the heatable element for imposing a constant electrical input thereon to thereby produce an output response in each segment indicative of a corresponding electrical resistance, sensing means for each segment responsively connected thereto for producing a discrete output indicative of a temperature corresponding to the output response of each segment, reference means associatively coupled to each segment for establishing a reference polarity signal therefor, and switch means responsively coupled to the sensing means and reference means for coupling the source of power to each segment over the connection means in a selected polarity, such that, the selected polarity for each segment is in the same sense for an unpowered condition of the corresponding segment and in the opposite sense therefrom for a powered segment; such that, each segment may be powered and thereby heated independently.

4,231,372

SAFETY MONITORING CIRCUIT FOR ELECTROSURGICAL UNIT

David W. Newton, Boulder, Colo., assignor to Valleylab, Inc., Boulder, Colo.

Filed Nov. 4, 1974, Ser. No. 520,269
Int. Cl.³ A61B *17/36*
U.S. Cl. 128—303.14 **8 Claims**



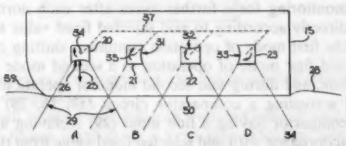
1. A radio-frequency electrosurgical device which comprises a radio-frequency generator, a power lead and a return lead, means for coupling the power lead and the return lead to the radio-frequency generator, an active electrosurgical electrode, means for coupling the power lead to the active electrosurgical electrode to power the active electrode, a passive electrode, means for coupling the passive electrode to the return lead, alternate path return means for coupling the return lead to ground at a point between the passive electrode and the radio-frequency generator, and means in the alternate path return means for indicating a predetermined radio-frequency return in the alternate path return means.

4,231,373

ULTRASONIC IMAGING APPARATUS

Albert S. Waxman, Los Gatos, and James F. Havlice, Los Altos, both of Calif., assignors to Diasonics, Sunnyvale, Calif.

Filed Jul. 18, 1978, Ser. No. 925,701
Int. Cl.³ A61B *10/00*
U.S. Cl. 128—660 **6 Claims**



1. An image acquisition apparatus for an ultrasonic imaging system comprising:

a housing defining a chamber, said housing including a body contacting membrane;

a plurality of transducers, each for transmitting and receiving ultrasonic sound, each of said transducers having an axis of rotation;

mounting means coupled to said housing for mounting each of said transducers for rotation in said chamber about its said axis of rotation, such that said axes of rotation are spaced-apart and parallel to one another;

driving means coupled to said mounting means for rotating said transducers at a constant rate of continuous uni-direc-

tional rotation about their respective said axes of rotation, and

a liquid disposed within said cavity,

whereby as said transducers rotate, a high resolution, real time image over a large field-of-view is obtained.

4,231,374
PROCEDURE AND DEVICE FOR THE DETECTION OF EXTRAORDINARY EVENTS IN A SERIES OF ESSENTIALLY PERIODICALLY RECURRING NORMAL EVENTS

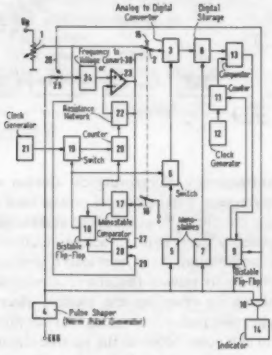
Karl Hudek, Erlangen, and Kurt Weigert, Nuremberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Oct. 23, 1978, Ser. No. 953,896

Claims priority, application Fed. Rep. of Germany, Nov. 7, 1977, 2749791

Int. Cl.³ A61B 5/04

U.S. Cl. 128—702 **12 Claims**



1. Procedure for the detection of extraordinary events in a series of essentially periodically recurring normal events, particularly extra systoles in the EKG, said procedure comprising:

manually setting a control (1) to a selected fixed value representing a time period corresponding to a fixed monitoring interval between successive occurrences of a normal event,

in a first mode of operation responding to each occurrence of the normal event to begin scanning for a further event, and continuing such scanning for a fixed time duration which corresponds to said selected fixed value, and so monitoring for a further event after each normal event directly according to said selected fixed value so long as the first mode of operation continues, shifting over from said first mode of operation to a second mode of operation, and during said second mode of operation:

(a) activating a comparator circuit (17, 18, 28) with the compartor having a first input (29) receiving a signal in accordance with said selected fixed value from the control (1) and having a second input (27) connected with a voltage regulator (22, 23),

(b) monitoring the actual repetition rate of currently occurring normal events by means of a frequency to voltage converter (24),

(c) supplying the output of the frequency to voltage converter (24) to said voltage regulator (22, 23) with the output of the voltage regulator being connected to the second input (27) of he comparator circuit (17, 18, 28),

(d) step by step adjusting the amplification factor of the voltage regulator (22, 23) until the output therefrom as supplied to the second input (27) of the comparator circuit matches the signal at the first input (29) thereof,

(e) responding to the matching at the first and second inputs of the comparator circuit (17, 18, 28) to fix the amplification factor at the currently adjusted value, and

(f) thereafter during said second mode of operation supplying the output of the voltage regulator (22, 23) with the amplification factor thereof adjusted according to steps (d) and (e) as a control value representing the time duration of a concomitantly variable monitoring interval, and thereafter responding to each occurrence of the normal event to begin scanning for an extraordinary event, and continuing such scanning for a time duration which is a function of said control value during said second mode of operation.

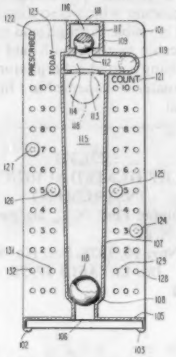
4,231,375
PULMONARY EXERCISER

John R. Boehringer, and John H. Lecky, both of Wynnewood, Pa.

Filed Oct. 20, 1977, Ser. No. 843,984

Int. Cl.³ A63B 23/00

U.S. Cl. 128—725 **10 Claims**



1. Spirometer apparatus comprising:

(a) housing means including integral, operatively associated, alternately effectuated closable openings for inspiratory flow responsive and expiratory pressure means associated therewith;

(b) indicating means, associated with said inspiratory flow means, for quantifying the inspiratory pulmonary condition of the user; and

(c) said expiratory pressure means being of the positive end expiratory pressure type employing a deadweight force means operative against one of said openings in resistance to expiratory flow through the orifice.

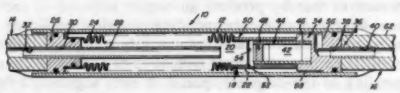
4,231,376
PRESSURE SENSOR

Warren C. Lyon, Baltimore, and William H. Hayes, Jr., Woodbine, both of Md., assignors to Hittman Corporation, Columbia, Md.

Continuation of Ser. No. 698,895, Jun. 23, 1976, abandoned, which is a continuation of Ser. No. 488,988, Jul. 16, 1974, Pat. No. 4,027,661. This application Aug. 7, 1978, Ser. No. 931,526

Int. Cl.² A61B 5/00

U.S. Cl. 128—748 **8 Claims**



1. A novel subcombination for use in a pressure sensor appa-

ratus of the type that is embodied in the human body for obtaining, non-invasively, indications of internal body pressure, particularly intracranial pressure, including a two-component communication means operative upon relative movement therebetween capable of communicating internal body pressure indications non-invasively to the exterior of the body and, wherein said internal body pressure indications are detected in the body by a flexible fluid-filled tambour, said novel subcombination comprising an elongated, substantially cylindrical housing, a bellows support member connected to said housing at one end thereof and defining one of the end walls of said housing, a fluid filling the complete interior of said housing for communcating with the fluid-filled tambour through the other end of the housing to enable the transfer of fluid to the interior of the housing in proportion to the body pressure detected by the fluid-filled tambour, an elongated, substantially cylindrical elastic bellows suspended in said fluid within said housing, one end of said bellows being connected to said bellows support member for supporting said bellows coaxially within said housing and in suspension within said housing, with the substantially cylindrical side wall portion of said bellows extending from said one end of the bellows to the other end of the bellows, coaxial with said housing, said substantially cylindrical side wall portion of the bellows having a diameter less than the diameter of said housing defining an annular space therebetween, said other end of said bellows comprising a first attaching means for attaching a first component of a communication means and being spaced from the other end of the housing free of any fixed connection with said housing, said other end of the housing comprising a second attaching means for attaching a second component of a communication means free of any fixed connection with said bellows, said bellows and said housing defining a first chamber, including said annular space and said bellows and said bellows support means defining a second chamber isolated from the first chamber, each of said first and second chambers being filled completely with fluid, means for placing said first chamber in fluid communication with the fluid-filled tambour, means for permitting fluid within said second chamber to flow into and out of said second chamber upon actuation of said bellows in proportion to the amount of fluid flowing into said first chamber, the movement of said bellows taking place in a direction substantially parallel to the major axis of said housing.

4,231,377

WRAPPER FOR SMOKING ARTICLES CONTAINING MAGNESIUM OXIDE

Warren K. Cline, Brevard, and Richard H. Martin, Pisgah Forest, both of N.C., assignors to Olin Corporation, Pisgah Forest, N.C.

Filed Aug. 30, 1978, Ser. No. 937,936
Int. Cl.[3] A24B *15/28;* A24D *1/02*
U.S. Cl. 131—9 **20 Claims**

1. A wrapper for the tobacco charge in a smoking article comprising a combustible cellulosic sheet containing at least 15% magnesium oxide and at least 0.5% of a chemical adjuvant salt selected from the group consisting of the alkali metal acetates, carbonates, citrates, nitrates and tartrates, both percentages by weight based upon the weight of the wrapper.

4,231,378

DEVICE FOR PERFORATING PACKAGED CIGARETTES

Pierre M. Stevens, 7 Stone Arch Dr., Old Westbury, N.Y. 11568

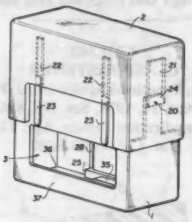
Filed May 11, 1978, Ser. No. 904,792
Int. Cl.[3] A24F *13/00*
U.S. Cl. 131—170 R **30 Claims**

1. A device for perforating packaged cigarettes, or the like, comprising:

a first housing member at least partially defining a receiving area for a package of cigarettes, or the like;

piercing means coupled to said first housing member and carrying a plurality of piercing needles, said piercing means being moveable relative to said first housing member to cause said piercing needles to pierce the cigarettes in the cigarette package;

said first housing member comprising needle receiving openings through which said piercing needles pass for guiding said piercing needles during the piercing of said cigarettes; and



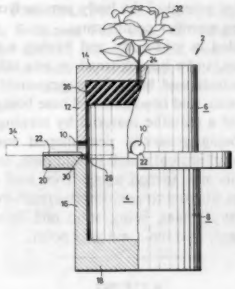
locking means coupled to at least one of said first housing member and piercing means for locking said first housing member and piercing means relative to each other so that they are substantially immovable relative to each other, thereby preventing said piercing needles from passing through said needle openings.

4,231,379

ASH TRAY

Yoshinori Kohori, 43-3, 3-chome, Aoyamadai, Suita, Japan

Filed Dec. 14, 1978, Ser. No. 969,332
Claims priority, application Japan, Jan. 10, 1978, 53-1729[U]; Jan. 13, 1978, 53-3263[U]
Int. Cl.[3] A24F *13/18, 19/14*
U.S. Cl. 131—235 R **6 Claims**



1. An ash tray for supporting a smoke producing object, said ash tray comprising:

(a) a wall means for defining an enclosed interior space, said wall means comprising a vertically extending side wall means, an upper panel covering the upper end of said side wall means and a bottom panel covering the lower end of said side wall means;

(b) at least one aperture means formed in said side wall means for defining an opening into said interior space, said aperture means being adapted to permit insertion of said object;

(c) a flange means formed adjacent to and below said aperture means, said flange means being adapted to support said object inserted into said aperture means;

(d) at least one small hole formed in said upper panel to allow the smoke in said enclosed interior space to go out; and

(e) a filter to remove the harmful substance in the smoke, said filter being located at an upper part of said enclosed

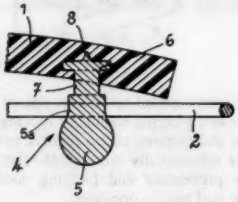
interior space and arranged to come into close contact with the inner surface of said upper panel, wherein the smoke from said object is trapped within said enclosed interior space such that after a predetermined time the burning of the object will be extinguished, and wherein the smoke filling said enclosed interior space gradually flows out through said filter and said small hole.

4,231,380

CLASP FASTENER

Pierre F. X. Seiller, Proulieu-Lagnieu (Ain), France

Filed Apr. 14, 1978, Ser. No. 896,392
Claims priority, application France, Apr. 15, 1977, 77 11970
Int. Cl.³ A45D *8/00*
U.S. Cl. 132—47 **1 Claim**



1. A hair clip or the like comprising:
an elongated body of synthetic-resin material having an obverse side and a reverse side;
a hinge mounted on said reverse side of said body at one end thereof;
a bent-wire arm swingably mounted at one end on said hinge and having a free end formed with a pair of legs resiliently deflectable outwardly; and
a retaining member anchored in said body on said reverse side thereof at an end of the body remote from said hinge, said retaining member comprising:
a base embedded in said body and having a square planar configuration, and a head formed on one side of said base and lying outside said body for engagement between the legs of said arm, said head and said base being solid unitarily formed of a metallic material by turning or molding, said head being generally pear-shaped and being connected by a cylindrical shank to said base, said base being formed on its side turned away from said shank with a central point adapted to position the retaining member on said body, said shank being solid and formed unitarily with said head, said base and said point.

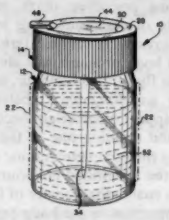
4,231,381

DENTAL FLOSS AND DENTAL AID HOLDER

Orlando A. Battista, 5280 Trail Lake Dr., Fort Worth, Tex. 76133

Filed Dec. 4, 1978, Ser. No. 965,820
Int. Cl.³ A61C *15/00*
U.S. Cl. 132—89 **10 Claims**

1. A throw-away composite dental aid article comprising in combination:
a container body for storing therewithin a supply of mouthwash, said container having a threaded open end;
a closure cap including a compartment containing dental floss said compartment defined by a peripherally extending side wall, a bottom wall and a top wall having an aperture therein, said closure cap having a depending skirt which is threaded to engage cooperably with the threaded portion of the container body to releasably secure the closure cap thereto;
a toothpick connected to the said bottom wall of said closure cap so as to depend therefrom and extend into said container when the closure cap is secured thereto;
and a cap dimensioned and configured to seat within said aperture aperture of the top wall of said closure cap to



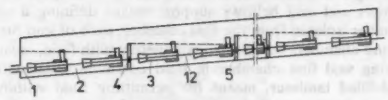
selectively provide access to the interior of said compartment.

4,231,382

COOLING STRAND FOR COOLING SMALL-SECTION STEEL

Hugo Beerens, Meersbusch, Fed. Rep. of Germany, assignor to Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Jun. 12, 1978, Ser. No. 914,619
Claims prior.ty, application Fed. Rep. of Germany, Jun. 16, 1977, 2727362
Int. Cl.³ B08B *3/02*
U.S. Cl. 134—64 R **4 Claims**



1. A cooling strand for cooling small-section steel passing through said strand in a first direction, the strand comprising:
a water container with water therein;
a plurality of cooling tubes immersed in said water and arranged coaxially within the water container, each tube having a constant internal diameter and a diameter to length ratio of from 1:5 to 1:15;
a plurality of pipes being provided at one end of each tube around the circumference thereof for feeding water under pressure into respective tubes in a direction having a component in opposition to said first direction; and means for providing a flow of water under pressure through said pipes and for inducing a flow of water through said tubes in opposition to said first direction while said steel is moving through the tubes.

4,231,383

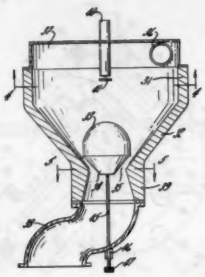
METHOD FOR CONTROLLING MASS FLOW RATE

James F. Eversole, Mamaroneck, N.Y., and Lester P. Berriman, Irvine, Calif., assignors to Dresser Industries, Inc., Dallas, Tex.

Continuation of Ser. No. 622,521, Oct. 15, 1975, Pat. No. 4,023,125, which is a division of Ser. No. 388,761, Aug. 16, 1973, Pat. No. 3,952,776, which is a continuation-in-part of Ser. No. 151,373, Jun. 9, 1971, Pat. No. 3,778,038, which is a continuation-in-part of Ser. No. 17,086, Mar. 6, 1970, abandoned. This application Jan. 31, 1979, Ser. No. 7,946
The portion of the term of this patent subsequent to Dec. 11, 1990, has been disclaimed.
Int. Cl.³ F02M *9/00*
U.S. Cl. 137—1 **2 Claims**

1. A method for delivering a gaseous medium at a controlled mass flow rate to a downstream location subject to a range of

variable pressure conditions comprising the steps of flowing a gaseous medium from an upstream entry point toward the downstream location, passing the gaseous medium through a variable area constricted zone to increase the velocity thereof to sonic, passing the gaseous medium immediately downstream from the variable area constricted zone through a zone of gradually increasing cross-sectional area substantially corresponding to that of a conical section having an apex angle in the range of about 6° to 18° and having an exit comprising the downstream location in order to gradually reduce the velocity of the gaseous medium and efficiently recover kinetic energy as static pressure, and adjustably varying the cross-sectional areas of the constricted zone and the zone of gradually increasing cross-sectional area in accordance with mass flow rate requirements of associated equipment in communication with the downstream location and to which the gaseous medium is to be delivered whereby the kinetic energy of the gaseous medium recovered as static pressure within the zone of gradually increasing cross-sectional area maintains the velocity of the gaseous medium through the constricted zone sonic when the pressure at the downstream location is at or below a predetermined value less than the gaseous medium pressure at the entry point but substantially more than 60% thereof so that the mass flow rate of the gaseous medium, at a given entry temperature and pressure, is directly proportional to, and is determined by the cross-sectional area of the constricted zone.



4,231,384

APPARATUS FOR DRAINING A COOLING SYSTEM

Fredrich M. Christensen, 10256 Prarie Rd., Omaha, Nebr. 68134

Division of Ser. No. 826,145, Aug. 19, 1977, Pat. No. 4,126,108, which is a continuation-in-part of Ser. No. 764,708, Feb. 1, 1977, abandoned. This application Aug. 11, 1978, Ser. No. 932,908

Int. Cl.³ F16K *31/143;* F01P *11/20*

U.S. Cl. 137—62 **11 Claims**

1. A drain valve assembly comprising a housing containing

a. a manifold passage provided with a plurality of ports which lead to the exterior of the housing;

b. a depending drain passage leading from the manifold passage to the exterior of the housing;

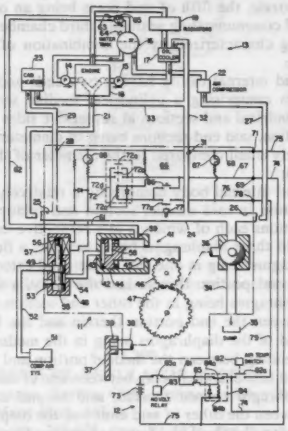
c. a rotary, plug type drain valve arranged to open and close the drain passage;

d. motor means effective when energized to open the drain valve but being ineffective to close that valve, the motor means comprising a single-acting fluid pressure actuating motor having a working space and a movable member which responds to the pressure in that space and is connected to open the drain valve;

e. a pilot valve provided with a supply passage, an atmospheric vent passage, and a motor passage connected with the working space, and including a control member movable between vent and supply positions in which, respectively, it connects the motor passage with the vent and supply passages;

f. means biasing the control member to the vent position, and a solenoid for shifting the control member to the supply position;

g. a manually operated valve actuator located outside the housing and coupled with the drain valve for opening and closing same, but being effective to close the drain valve only when the working space of the fluid pressure actuating motor is vented; and



h. an electrical circuit having at least a pair of terminals leading to the exterior of the housing and which are interconnected by a loop containing the solenoid and a normally open switch means.

4,231,385

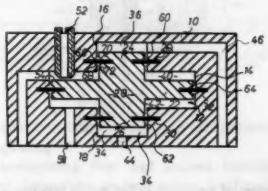
PNEUMATIC CONTROLLER

Günther Roth, Solingen, Fed. Rep. of Germany, assignor to Sunvic Regler GmbH, Solingen-Wald, Fed. Rep. of Germany

Filed Mar. 29, 1979, Ser. No. 24,958

Int. Cl.³ G05D *16/00*

U.S. Cl. 137—86 **5 Claims**



1. A pneumatic controller wherein the commanded value and the actual value as well as a positive and a negative feedback are represented by pressures and which provides an output pressure value determining a final control quantity, comprising a housing defining an internal cavity and five ports communicating with said internal cavity, an inner body positioned in said internal cavity, and three spaced diaphragms interconnecting the housing and the body and supporting the body in said internal cavity for movement with respect to the housing, said diaphragms with said body dividing the internal cavity into four pressure chambers, a respective one of four of said ports communicating with each chamber respectively, a first of said chambers being exposed to a commanded value pressure through the respective port, a second of said chambers being exposed to an actual value pressure through the respective port and counteracting the pressure in the first chamber, a third of said chambers being exposed to a negative

feedback pressure through the respective port, the fourth of said chambers being exposed to a positive feedback pressure through the respective port, the port communicating with said third chamber being a restricted air supply port and including an outlet nozzle in said third chamber, said body defining a baffle surface in said third chamber in juxtaposition to said outlet nozzle, the fifth of said ports being an output pressure port and communicating with said third chamber, said controller being characterized by the combination of the following features:

(a) said internal cavity having two ends and between said ends comprising a cylindrical median section and two cylindrical end sections at respective sides of the median section, said end sections being of diameters that are relatively small compared to the diameter of the median section;

(b) said internal body comprising a relatively large median portion in said median section and relatively small end portions each of which is in a respective end section;

(c) said three diaphragms being annular, a first of said diaphragms being in one end section and extending between the end portion therein and the body, a second of said diaphragms being in the other end section and extending between the end portion therein and the body, and the third of the diaphragms being in the median section and extending between the median portion and the body; and

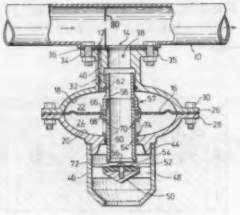
(d) said first chamber being between one of said ends and the diaphragm nearest thereto, said second chamber being between the other of said ends and the diaphragm nearest thereto, the third and fourth chambers being between the first and second chambers and being separated by the third diaphragm.

4,231,386

DIFFERENTIAL PRESSURE RELIEF VALVE

Heinz W. Braukmann, Willowdale, Canada, assignor to Braukmann Armaturen AG, Rothrist, Switzerland

Filed Mar. 23, 1978, Ser. No. 889,247
Int. Cl.[3] G05D *7/01*
U.S. Cl. 137—117 **3 Claims**



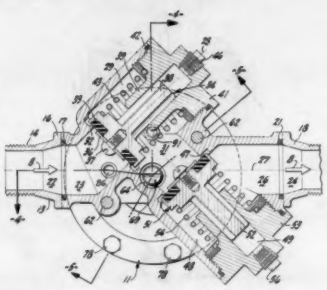
1. A differential pressure relief valve having a housing with first and second channels, said housing being adapted for facial connection to primary and secondary pressure zones in a conduit through said channels respectively, a first chamber in said housing connecting with the inner end of said first channel, a second chamber in said housing separated from said first chamber by an annular diaphragm supported by said housing, a movable sleeve in said housing secured to the inner edge of said diaphragm, said sleeve tranversing said chambers and sealed in said housing to isolate said chambers from the atmosphere, said sleeve having an aperture communicating with said lower said lower chamber, a seat in said housing exterior of said second chamber with the end of said sleeve protruding from said second chamber engageable with said seat and the other end of said sleeve, protruding from said first chamber, communicating with said secondary pressure zone through said second channel, the arrangement being such that when the primary pressure exceeds the secondary pressure by a predetermined amount, the lower end of the sleeve engages said seat due to the primary pressure on said diaphragm but when the primary pressure does not exceed the secondary pressure by the predetermined amount, the lower end of the sleeve does not engage the seat and fluid escapes from the conduit through the second channel and the sleeve past the seat.

4,231,387

BACKFLOW PREVENTING VALVE

Robert W. Dixon, Concord, Calif., assignor to Chas. M. Bailey Co., Inc., Emeryville, Calif.

Filed Jan. 11, 1979, Ser. No. 2,690
Int. Cl.[3] F16K *24/02*
U.S. Cl. 137—218 **1 Claim**



1. A backflow preventing valve comprising a first body portion terminating in a predetermined planar face, said first body portion having an inlet port and an outlet port both in alignment on a through first axis extending in a plane parallel to said planar face, means defining an inlet chamber in said first body portion open to said inlet port and also extending along a second axis disposed in said plane and intersecting said first axis, means defining an outlet chamber in said first body portion open to said outlet port and also extending along a third axis disposed in said plane and intersecting said second axis, means defining an intermediate chamber in said first body portion merging with said inlet chamber at an inlet valve seat centered in said plane and also merging with said outlet chamber at an outlet valve seat in said plane, an inlet valve in said intermediate chamber and having a valve stem movable in said plane toward and away from said inlet valve seat, a first spring in said intermediate chamber urging said inlet valve toward said inlet valve seat, an outlet valve in said outlet chamber and having a valve stem movable in said plane toward and away from said outlet valve seat, a second spring in said outlet chamber urging said outlet valve toward said outlet valve seat, a second body portion terminating in a predetermined planar face, means for releasably holding said first body portion and said second body portion with said planar faces substantially coincident and parallel to said plane, means defining in said first body portion an extension of said intermediate chamber disposed substantially perpendicular to said plane, means in said first body portion defining a vent valve seat surrounding said extension and substantially parallel to said plane, means defining in said second body portion a vent chamber extending perpendicular to said first plane and merging with said extension, means defining a vent to the atmosphere from said vent chamber, a vent valve having a stem movable in said extension normal to said plane and having on said stem a head movable into and out of engagement with said vent valve seat, a planar cap plate on said vent valve stem and extending parallel to said plane, a spring interposed between said second body portion and said cap plate for urging said vent valve away from said vent valve seat, a planar diaphragm extending parallel to said plane and abutting said cap plate and said second body portion, a diaphragm cap overlying said planar diaphragm on the side thereof opposite said cap plate and thereby establishing a diaphragm chamber, means for securing said diaphragm cap

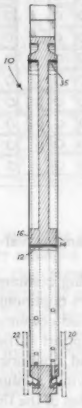
through said planar diaphragm to said second body portion, and means for establishing an air passage substantially normal to said first plane and extending from said inlet chamber then through said first body portion and then through said second body portion and then through said diaphragm and said cap into said diaphragm chamber.

4,231,388

GATE FOR USE IN A GATE VALVE

Charles C. Wallace, 7833 NE. Tillamook, Portland, Oreg. 97213

Filed Feb. 17, 1978, Ser. No. 878,705
Int. Cl.³ F16K *3/02*
U.S. Cl. 137—242 **7 Claims**



1. For use in a gate valve, a gate having upstream and downstream faces, a port defined by a cylindrical wall having a cylindrical axis extending through the gate's thickness and a marginal groove provided on each face, each groove being in open communication with its associated face during normal valving operation for collecting foreign material therein, the improvement comprising:

channel means formed in the gate extending along a radius from the cylindrical axis for providing a passage between the cylindrical wall and at least one of the grooves.

4,231,389

REMOVABLE OPERATOR FOR GATE VALVES

Robert C. Still; Frank J. Huppenthal; Barbara J. Smith, and Gerald H. Scotney, all of Tucson, Ariz., assignors to New Concepts, Inc., Tucson, Ariz.

Filed Sep. 15, 1978, Ser. No. 942,768
Int. Cl.³ F16K *43/00, 31/54*
U.S. Cl. 137—315 **24 Claims**

1. A removable operator for a gate valve, said operator being serially readily useable in the field with each of a plurality of gate valves and thereby eliminate the need for having gate repositioning apparatus attendant to and continuously remain with each of the gate valves, said operator comprising in combination:

(a) means for detachably attaching said operator to the gate valve;

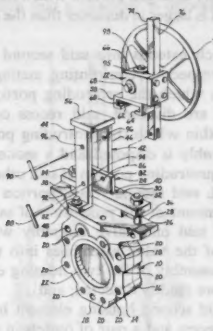
(b) positioning means for imparting translatory movement to the gate of the gate valve;

(c) means for engaging said positioning means with the gate of the gate valve;

(d) means for translating said positioning means; and

(e) means for maintaining the gate in the opened or closed position upon removal of said operator;

whereby, upon detachable attachment of said operator to the gate valve and on actuation of said positioning means, the gate



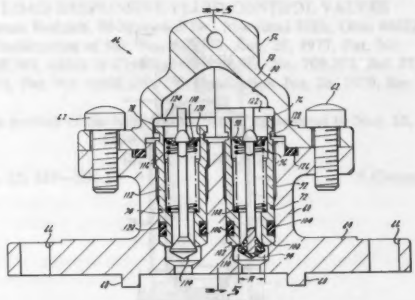
of the gate valve is raiseable or lowerable to open or close the gate valve.

4,231,390

PRESSURE REGULATOR SYSTEM

Kenneth W. Teague, Dayton, Ohio, assignor to Chrysler Corporation, Highland Park, Mich.

Division of Ser. No. 719,022, Aug. 30, 1976, Pat. No. 4,132,204.
This application Jul. 17, 1978, Ser. No. 925,078
Int. Cl.³ F16K *43/00, 17/04*
U.S. Cl. 137—315 **1 Claim**



1. In an internal combustion engine, a fuel pressure regulator assembly comprising:

a housing comprising first and second housing elements which are separable at respective confronting mating surfaces, and means separably securing said two housing elements together;

a pair of generally cylindrical adjacent bores which extend into said first housing element from the respective confronting surface thereof, said bores having essentially equal main diameters, but one of said bores including a larger diameter counterbore at the respective confronting mating surface;

a shoulder in the main diameter of each bore;

a pair of generally cylindrical pressure relief valve assemblies, each disposed in a respective one of said bores and abutting the shoulder thereof, each valve assembly protruding from the respective bore at the respective confronting mating surface with one of said valve assemblies having a portion protruding farther beyond its respective bore than does a corresponding portion of the other valve assembly beyond its respective bore, said valve assemblies having essentially equal main diameters fitting within the

main diameters of the respective bores, said other valve assembly being disposed in said one bore and having a diametrically enlarged portion which fits within the counterbore but is larger in diameter than the main diameters of the bores;

a recess which extends into said second housing element from the respective confronting mating surface thereof and within which the protruding portions of said valve assemblies are disposed, said recess comprising a first portion within which the protruding portion of said one valve assembly is disposed and a second portion within which the protruding portion of said other valve assembly is disposed, said second recess portion being no deeper than the amount of the protrusion of said corresponding portion of said one valve assembly whereby incorrect assembly of the valve assemblies into the bores and/or incorrect assembly of the two housing elements together may be more readily detected; and

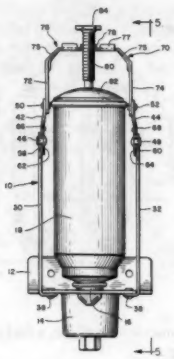
an inlet in said second housing element in communication with said recess and a pair of outlets in said first housing element, each outlet being in communication with a corresponding one of said bores and each valve assembly regulating flow between said inlet and the corresponding outlet.

4,231,391

CANNISTER MOUNTING BRACKET

James W. Burke, Long Grove, and John N. Cook, Island Lake, both of Ill., assignors to Kru-Bur, Inc., Algonquin, Ill.

Filed Feb. 21, 1978, Ser. No. 879,253
Int. Cl.³ F16K *27/08*
U.S. Cl. 137—613 **12 Claims**



1. A bracket for mounting a cannister to a valve assembly, said bracket comprising:

means for mounting a valve assembly, said mounting means defining two spaced pivot points;

means for contacting a cannister to urge and hold the cannister against the valve assembly, said contacting means defining two spaced pivot points; and

a pair of link members interposed between the mounting means and the contacting means for altering the separation between the mounting means and the contacting means, each link member having a first end pivotably connected to a respective one of the contacting means pivot points and a second end pivotably connected to a respective one of the contacting means pivot points;

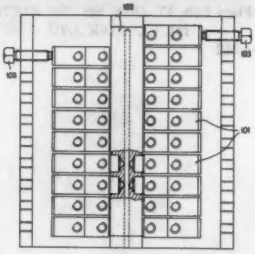
said link members pivotable about the mounting means between a first position, in which the contacting means is positioned to accept cannisters of a first size, and a second position, in which the contacting means is positioned to accept cannisters of a second size, larger than the first size.

4,231,392

COLOR-CHANGING VALVE FOR AN AUTOMATIC PAINTING MACHINE

Jean-Pierre Allibert, Chatenay Malabry, France, assignor to Regie Nationale des Usines Renault, Boulogne Billancourt, France

Filed Aug. 21, 1978, Ser. No. 935,374
Claims priority, application France, Aug. 22, 1977, 77 25556
Int. Cl.³ F16K *19/00*
U.S. Cl. 137—454.2 **2 Claims**



1. A modular color-changing valve for automatic painting machine comprising:

a longitudinally-extending common manifold having a plurality of tapered bores communicating therewith;

means for supporting said common manifold, said supporting means having support surfaces extending parallel to and spaced from said common manifold, each of said support surfaces having a plurality of threaded bores formed therein, the axes of the threaded bores being parallel with the axes of the tapered bores of said common manifold;

a plurality of unitary valves interposed between said support surfaces and said common manifold, each of said valves having a tapered nozzle received in a tapered bore of said common manifold; and

a plurality of screws threadedly engaged with threaded bores of said support surfaces, ends of said screws contacting portions of said unitary valves to urge said tapered nozzles of said unitary valves into sealing engagement with said tapered bores of said common manifold.

4,231,393

ARRANGEMENT IN OR RELATING TO A VALVE

Arne Byfuglien, Nygard, Norway, assignor to A/S Raufoss Ammunisjonsfabrikker, Raufoss, Norway

Filed May 15, 1979, Ser. No. 39,141
Claims priority, application Norway, May 19, 1978, 781751
Int. Cl.³ F16K *31/122*
U.S. Cl. 137—491 **6 Claims**

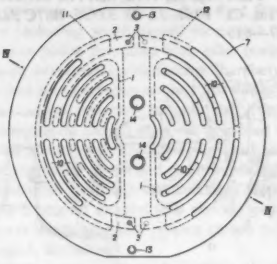
1. Arrangement in or relating to a valve comprising a housing (1) having an inlet (2) and an outlet (3) whose interconnection is closable by means of a differential piston (5) which is slidably arranged in a cylinder (4) in the housing (1), said differential piston being equipped with a bore (8) which connects its large (6) and small (7) sides, said valve further comprising a conduit or the like (15, 16, 17) leading from the chamber (10) in the housing (1) on the large side (6) of the differential piston to the outlet (3), said conduit or the like (15, 16, 17) being equipped with a pilot valve (14) for closing and opening of the conduit, characterized in that in the conduit or the like (16, 17) downstream of the pilot valve (14) is a valve means (18) which is arranged at a predetermined pressuure on its downstream side (17) to open its upstream side (16) to the pressure of the surroundings.

4,231,394

CLOSING MEMBER FOR A RING VALVE

Hans Hrabal, and Josef Wimmer, both of Vienna, Austria, assignors to Enfo Grundlagen Forschungs AG, Döttingen, Switzerland

Continuation of Ser. No. 825,781, Aug. 18, 1977, abandoned. This application May 30, 1979, Ser. No. 43,654
Claims priority, application Austria, Jul. 1, 1977, 46901/77
Int. Cl.[3] F16K *15/14*
U.S. Cl. 137—512 8 Claims



1. A closing reed for mounting on a valve seat having a plurality of concentrically arranged portways, comprising:

a plurality of flexible ring members extending in radial spaced concentric relationship over an angle less than 360° for controlling the flow of fluid through the valve portways and being separated by concentrically extending slits between adjoining ring members;

the outermost one of said flexible ring members including two substantially diametrically positioned mounting holes and being continuous therebetween;

at least one radially extending web member interconnecting said plurality of concentric ring members and said outermost flexible ring member; and

additional radially extending web members interconnecting at least some of said plurality of concentric ring members and said outermost ring member, said additional web members being respectively located at intermediate positions on the circumference of said outermost ring member between said mounting holes.

4,231,395

NON-RETURN VALVE

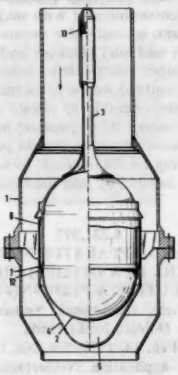
Ronald Versluis, Alphen a/d Rijn, Netherlands, assignor to B.V. Neratoom, The Hague, Netherlands

Filed Aug. 30, 1978, Ser. No. 937,987
Claims priority, application Netherlands, Sep. 6, 1977, 7709799
Int. Cl.[3] F16K *15/02*
U.S. Cl. 137—514.7 7 Claims

1. A non-return valve including a valve body having a fluid inlet, a fluid outlet, and an annular valve seat disposed in the body between the inlet and outlet; an enclosed hollow valve member, and a valve guide bush mounted in the valve body on one side of and coaxial with the valve seat, the valve guide bush having an elongated imperforate casing with an open end directed toward the valve seat and being closed at the other end, and the valve member having a portion disposed within said guide bush for axial displacement between a valve shut position in which the valve member makes sealing contact with the valve seat and a valve open position in which the valve member is axially spaced from the valve seat, wherein the improvement comprises:

means for forming a constricted space between the inner wall of the valve guide bush casing and the outer wall of the portion of the valve member disposed within the guide bush for a limited axial range adjacent to the valve shut position for damping the movement of the valve member as it approaches the shut position and

means for limiting the entry of the valve member into the guide bush such that a chamber is disposed between the



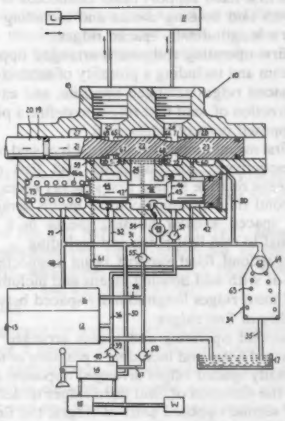
closed end of the valve guide bush casing and the valve member even when the valve member extends the greatest admissible distance into the guide bush, whereby the withdrawal of the valve member from the guide bush is not impeded by adhesion forces therebetween.

4,231,396

LOAD RESPONSIVE FLUID CONTROL VALVES

Tadeusz Budzich, 80 Murwood Dr., Moreland Hills, Ohio 44022

Continuation of Ser. No. 828,643, Aug. 29, 1977, Pat. No. 4,165,761, which is a continuation of Ser. No. 709,202, Jul. 27, 1976, Pat. No. 4,058,139. This application Jan. 26, 1979, Ser. No. 7,159
The portion of the term of this patent subsequent to Nov. 15, 1994, has been disclaimed.
Int. Cl.[3] F15B *13/08*
U.S. Cl. 137—596.13 5 Claims



1. A valve assembly supplied with pressure fluid by a pump comprising a housing having a fluid inlet chamber connected to said pump, a fluid supply chamber, first and second load chambers, and fluid exhaust means, first valve means for selectively interconnecting said fluid load chambers with said fluid supply chamber and said fluid exhaust means, first variable

fluid metering orifice means responsive to movement of said first valve means between said fluid supply chamber and said load chambers, second variable fluid metering orifice means responsive to movement of said first valve means between said load chambers and said exhaust means, negative load pressure sensing means between said load chambers and said exhaust means selectively communicable with said load chambers by said first valve means, second valve means having fluid isolating means between said inlet chamber and said supply chamber, said inlet chamber being solely communicable with said supply chamber by said second valve means, said fluid isolating means having means operable to isolate said inlet chamber from said supply chamber when pressure in said negative load pressure sensing means exceeds a certain predetermined level, and fluid replenishing means operable to supply fluid flow to said load chamber isolated by said fluid isolating means.

4,231,397

METHOD OF, AND APPARATUS FOR, REGULATING THE PRESSURE IN A DEFORMABLE CONDUIT CONDUCTING A FLOWING FLUID

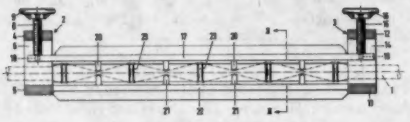
Johannes H. te Riele, Amersfoort, Netherlands, assignor to Remia B.V., Den Dolden, Netherlands

Filed Feb. 14, 1979, Ser. No. 12,154

Claims priority, application Netherlands, Feb. 17, 1978, 7801848

Int. Cl.³ F16K *7/06*

U.S. Cl. 137—614.11 **2 Claims**



1. Apparatus for regulating the pressure of a fluid flowing in a deformable conduit, comprising

(a) at least two spaced annular housing means through which the deformable conduit passes;

(b) first fluid pressure control means arranged between said spaced annular housing means in a first plane and including

(1) a first fixed support beam connected at opposite ends with said housing means and including a plurality of first longitudinally spaced ridges;

(2) first operating rod means arranged opposite said first beam and including a plurality of second longitudinally spaced ridges arranged opposite, and extending in the direction of, said first ridges to define a plurality of first opposed pairs of ridges; and

(3) first means connected with each of said housing means, respectively, for displacing said first operating rod means relative to said first support beam; and

(c) second fluid pressure control means arranged between said spaced annular housing means in a second plane normal to said first plane and including

(1) a second fixed support beam connected at opposite ends with said housing means and including a plurality of third ridges longitudinally spaced between said plurality of first ridges;

(2) second operating rod means arranged opposite said second beam and including a plurality of fourth longitudinally spaced ridges arranged opposite, and extending in the direction of, said third ridges to define a plurality of second opposed pairs of ridges, the flexible conduit being arranged between said first and second pairs of ridges, respectively; and

(3) second means connected with each of said housing means, respectively, for displacing said second operating rod means relative to said second support beam, whereby displacement of said first and second operating rods changes the cross-sectional area of the flexible conduit, thereby to control the pressure of fluid flowing therethrough.

4,231,398

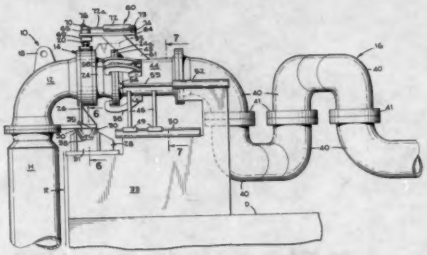
CARGO HOSE TO MARINE TANKER CONNECTION APPARATUS

Harold M. Gibbons, deceased, late of Long Beach, Calif. (by Gladys M. Gibbons, executrix), assignor to FMC Corporation, San Jose, Calif.

Filed Sep. 12, 1978, Ser. No. 941,699

Int. Cl.³ F16L *27/00, 37/28;* **B67C** *3/34*

U.S. Cl. 137—615 **7 Claims**



1. Apparatus for connecting a manifold of a tanker in a coaxial fluid-tight relationship with a petroleum-transfer hose having a hose-assembly mounted on the end thereof, said apparatus comprising:

means for securing said hose in a position substantially vertical along side said tanker; a spool flange connected to one end of said hose assembly; a rigid pipe elbow connected to said hose and including said flange;

a pipe coupler having a coupler flange at one end thereof;

a universal pipe joint;

means for coupling said universal joint between said pipe coupler and said manifold;

a support track for supporting and guiding said pipe coupler as it moves relative to said manifold; the outlet of said pipe elbow being substantially parallel to said support track;

means for moving said pipe coupler along said support track relative to said spool flange and said manifold with said coupler flange being directed into coaxial alignment with said secured spool flange; and

means for securing said spool flange to said coupler flange in a fluid-tight connection.

4,231,399

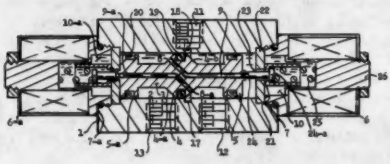
MOMENTARY CONTACT REVERSING DIVERTER

Richard S. Pauliukonis, 6660 Greenbriar Dr., Cleveland, Ohio 44130

Continuation-in-part of Ser. No. 872,231, Jan. 25, 1978, Pat. No. 4,178,768. This application Feb. 5, 1979, Ser. No. 9,678

Int. Cl.³ F16K *31/122, 31/06, 11/07*

U.S. Cl. 137—625.4 **4 Claims**



1. A momentary contact valve for selectively porting pressurized fluid comprising:

a multiported valve housing having a first and a second ends interconnected by an axially extending bore passing therethrough and closed by an identical electrical solenoid operator at each opposite housing end including a central solenoid plunger movable selectively between an open position when said operator is momentarily energized electrically and a closed position when said operator is de-energized, including a fluid supply and discharge port means incorporated therein,

a valving means inside said bore slidable between a first and a second positions selectively porting fluid flow through said valve including an elongated stem with a centrally located valve piston provided with pilot ports initiating therein in an overlapping relationship therebetween so as to have a first pilot port start on the right side of said valve piston and extend generally longitudinally through said stem discharging on the left stem end provided with a first integral end piston while a second pilot port starts on the left side of said valve piston and extends through said stem longitudinally for discharge on the right stem end provided with a second integral end piston, with pilot discharge ports inside said end pistons closed by said solenoid plungers, including

a valve shifting means with said position change of said valving means and means for maintaining said valving means in one of said positions driftless.

4,231,400

REMOVABLE TWO-WAY CONNECTOR FOR A FAUCET NOZZLE

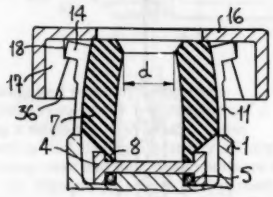
Gerard Friedling, 7, ch. des Bruchons, CH 1225 Veyrier (Geneva), and Marcel Chuard, 7d, ch. Vert, CH 1217 Meyrin (Geneva), both of Switzerland

Filed May 21, 1979, Ser. No. 40,591

Claims priority, application Switzerland, May 30, 1978, 5881/78

Int. Cl.³ F16L *37/28*

U.S. Cl. 137—798 **7 Claims**



1. A removable two-way connector for a faucet nozzle, which comprises

(a) a body having a generally annular wall divided into a plurality of segments by gaps defined between the segments, the annular wall defining a cavity in the body and including a peripheral flange, the flange bring configurated to form a spiral camming face at each wall segment,

(b) a deformable packing sleeve disposed in the cavity adjacent the generally annular wall, and

(c) a rotary cover mounted on the body and capping the cavity, the cover having radially inwardly extending ribs having cam follower faces arranged to engage the spiral camming faces, the body wall and cover being arranged to cooperate to force the wall segments radially inwardly upon rotation of the cover in relation to the body and corresponding displacement of the cover ribs along the spiral camming faces whereby the inwardly forced wall segments are pressed against the deformable packing sleeve and the sleeve sealingly engages a nozzle surrounded by the sleeve.

4,231,401

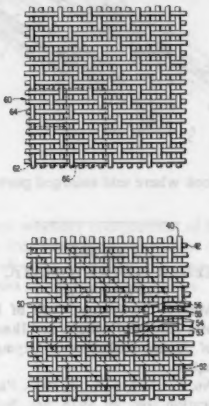
FABRIC FOR PAPERMAKING MACHINES

Tibor L. Matuska, Pensacola, Fla., assignor to Unaform, Inc., Shreveport, La.

Filed Jun. 16, 1978, Ser. No. 916,125

Int. Cl.² D03D *15/00*

U.S. Cl. 139—383 A **26 Claims**



1. A planar forming fabric comprising at least one single layer fabric having first and second surfaces, a plurality of rounds of weave arranged to each other to define the width of said single layer fabric, said adjacently arranged rounds of weave repeated a desired number of times to define the length of said single layer fabric, each of said rounds of weave being defined by warp and weft yarns interwoven according to shedding and picking instructions determined by at least two different coplanar weave patterns, said adjacent rounds of weave comprising a plurality of cross-machine direction floats in close proximity to each other on said first surface, a plurality of machine direction knuckles on said first surface, a plurality of machine direction floats in close proximity to each other on said second surface, a plurality of cross-machine direction knuckles on said second surface, said knuckles and floats coacting to prevent misalignment of said floats that are in close proximity to each other, and to provide uniform drainage apertures on said fabric.

4,231,402

DRAWING GRIPPER FOR WEAVING LOOMS

Alberto Merisio, Colzate, Italy, assignor to Somet Societa Meccanica Tessile, S.p.A., Bergamo, Italy

Continuation of Ser. No. 862,904, Dec. 21, 1977, abandoned. This application Feb. 15, 1979, Ser. No. 12,250

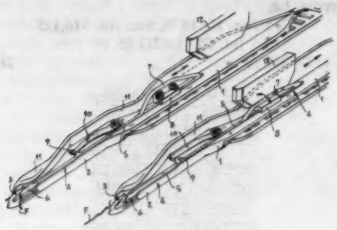
Claims priority, application Italy, Dec. 27, 1976, 30890 A/76

Int. Cl.³ D03D *47/20*

U.S. Cl. 139—448 **3 Claims**

1. Drawing gripper for weaving looms with continuous weft feed, comprising a gripper body, a claw attached to an end portion of said gripper body, said claw having a hook at one end, an oscillatable element positioned near one side of said body having at one end thereof an enlarged portion which is shaped to fit the interior contour of said hook, said interior contour of said hook and the enlarged portion of said oscillatable element cooperating with each other to wedge the weft thread grasped by the hook, and means on said body to allow oscillation of said element about its own longitudinal axis, the axis of said oscillatable element being arranged to pivot the enlarged portion externally of the profiled surface of the hook

of said claw, on the side of the body where the oscillatable element is arranged and positioned below the upper interior



surface of said hook where said enlarged portion contacts said hook.

4,231,403

LIQUID FEEDER FOR AUTOMATIC CULTURE APPARATUS

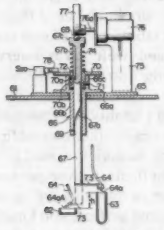
Shinroku Sogi; Makoto Yoshinaga, both of Hachioji; Toshio Shinohara, Chofu; Takayuki Aihara, and Ikuo Tawara, both of Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Division of Ser. No. 876,894, Feb. 13, 1978, Pat. No. 4,179,339. This application Dec. 26, 1978, Ser. No. 973,116

Claims priority, application Japan, Mar. 2, 1977, 52-24766; Apr. 5, 1977, 52-41589; Apr. 5, 1977, 52-41592

Int. Cl.[3] B65B *3/04*

U.S. Cl. 141—284 **3 Claims**



1. A liquid supply switching system for automatic culture apparatus comprising a hollow shaft extending through and secured to a stationary outer plate of an incubator, a drive shaft extending through the hollow shaft for rotation and vertical motion therein, the drive shaft being peripherally formed with a keyway and a rotation controlling cam groove in which a pin secured to the hollow shaft is fitted, the drive shaft being urged to move upwardly so that its upper end face bears against a vertical movement controlling cam, a rotating plate carrying a key which engages the keyway and rotatably fitted between the hollow shaft and the drive shaft so as to be capable of only rotation integrally with the drive shaft, a vertical movement controlling cam fixedly mounted on the output shaft of a drive motor and disposed in abutment against the upper end face of the drive shaft for controlling the vertical movement thereof as the motor rotates, a tube support arm extending from the lower end of the drive shaft and adapted to have the inner end of a flexible liquid supply tube mounted thereon, and an angular position detecting mechanism including a switch operating member mounted on the rotating plate and also including a pair of motor stopping limit switches disposed adjacent to the rotating plate at the opposite ends of the angular extent of rotation of the plate, the detecting mechanism causing the switches to deenergize the motor at a given angular position at which the vertical movement of the drive shaft is stopped for bringing the discharge port of the liquid supply tube to a given three dimensional position.

4,231,404

DEVICE FOR TRIMMING THE REEDS OF WIND INSTRUMENTS

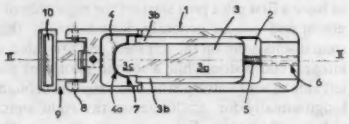
Bernard M. Van Doren, Saint Germain En Laye, and Jacques G. Frank, Conflana-Sainte Honorine, both of France, assignors to Etablissements VanDoren, Paris, France

Filed May 29, 1979, Ser. No. 43,509

Claims priority, application France, Dec. 22, 1978, 73.36140

Int. Cl.[3] G10G *7/00*

U.S. Cl. 144—2 R **6 Claims**



1. A device for retrimming the reed of a wind instrument, characterized in that it comprises a body a flat part of which forms a support for said reed, a removable cutting member having a profile corresponding to that of the end of said reed and projecting perpendicularly to the surface of said flat part, and a compression member pivotably mounted about a pin on said body and disposed so that it may be applied manually against said cutting member.

4,231,405

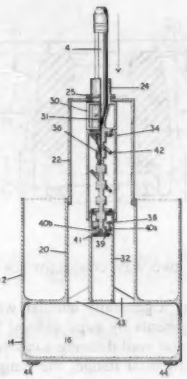
PENCIL DRIVEN MECHANICAL PENCIL SHARPENER

Jose F. Vila, 5508 31st Ave., No. 3, Woodside, N.Y. 11377

Filed Jun. 5, 1978, Ser. No. 912,225

Int. Cl.[2] B43L *23/02*

U.S. Cl. 144—28.4 **8 Claims**



1. A mechanical pencil sharpener actuated by insertion of a pencil thereinto which comprises:

(a) a frame;

(b) a cutter assembly having a longitudinal axis, said cutter assembly being rotatably and slidably mounted in said frame, such that a pencil to be sharpened may be inserted into the cutter assembly and forced against a portion thereof to cause sliding movement in the direction of movement of the pencil, from an initial position to a displaced position;

(c) a rod for rotating said cutter assembly to sharpen the pencil, said rod having an elongated longitudinal axis, said rod depending from said cutter assembly, being coaxially

aligned therewith and being kinematically unitary with said cutter assembly, said rod including means disposed longitudinally of its length for effecting such rotation of the cutter assembly;

(d) a sleeve fixably mounted within said frame and including means meshing with the means extending longitudinally of said rod for translating said sliding movement of said rod and said cutter assembly into simultaneous rotational movement of said rod and said cutter assembly, said sleeve being axially coincident with said rod and concentrically disposed thereto;

(e) a spring fixedly mounted between said cutter assembly and said frame, said spring being so arranged that said sliding movement of said cutter assembly pushes against said spring to compress it when a pencil is inserted and when the pencil is withdrawn, said spring returns to its initial position which, in turn, returns said cutter assembly to its initial position; and

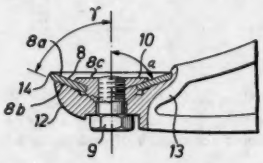
(f) conversion means cooperating with said rod for rotating said cutter assembly upon insertion of the pencil and longitudinal movement of said rod, said conversion means including a coupling which renders the drive train ineffective upon withdrawal of the pencil and return of the cutter assembly to its initial position.

4,231,406

DEVICE FOR TREATMENT OF THE SURFACE OF ROUND TIMBER

Karl-Erik A. Jonsson, Floraplan 14, S-802 28 Gävle, Sweden

Filed Nov. 9, 1978, Ser. No. 959,304
Claims priority, application Sweden, Nov. 11, 1977, 7712802
Int. Cl.³ B27L *1/00*
U.S. Cl. 144—208 E **23 Claims**



1. A cutting tool assembly comprising:

(a) an arm having at the free end thereof a recess portion having a substantially pyramidal shape;

(b) a cutting tool having a plurality of cutting edges and containing inner and outer major surfaces which substantially are disposed in and at least partially substantially correspond to said recessed portion; and

(c) fastening means for securing said cutting tool to said recessed portion of said arm.

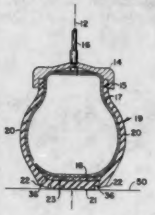
4,231,407

PROTECTIVE LINER FOR TIRES RESISTANT TO DISPLACEMENT DURING USE

David L. James, Fresno, Calif., assignor to Mitchell D. James, Calif.

Filed Jun. 23, 1978, Ser. No. 918,475
Int. Cl.³ B60C *5/08*
U.S. Cl. 152—351 **3 Claims**

1. A protective liner for a tire having a tread portion with lateral boundaries extending circumferentially about the tire equal distances on opposite sides of a plane of reference passing through the tire substantially normal to its intended axis of rotation, a soft resilient inner surface and housing a pressurized tube, the liner comprising an elongated strip of puncture resistant material captured between the pressurized tube and the inner surface of the tire extending circumferentially about the tube; and a pair of spaced ribs integral with the liner each having side surfaces disposed in planes outwardly convergent to an apex and the ribs extending substantially lengthwise of the liner for embedded engagement with the interior surface of the tire substantially aligned with the tread portion of the tire, each rib having an outer surface substantially parallel to the plane of reference and an inner surface obliquely related to the



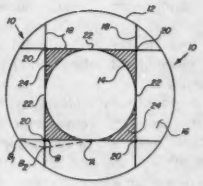
plane of reference whereby compression of the liner between the tube and the tire causes the inner surface of the ribs to urge the ribs from each other to tension the liner transversely therebetween to resist displacement in the tire.

4,231,408

TIRE STRUCTURE

Henry Replin, 110 S. Dexter St., Denver, Colo. 80222

Filed Jun. 8, 1978, Ser. No. 913,975
Int. Cl.³ B60C *9/00*
U.S. Cl. 152—353 R **17 Claims**



5. A pneumatic tire structure comprising:

a tread;

a pair of opposing sidewalls extending from said tread and defining an inner annular opening;

an inner annular member carried by each sidewall;

from three to eight elongated wire or cord members arranged symmetrically around and tangential to each said inner annular member; and

reinforcing comprising a built-up area of additional rubber on said sidewall limited to and completely filling the area between each point of tangency, the inner annular member and the adjacent elongated wire or cord member.

9. A pneumatic tire structure comprising:

a tread;

a pair of opposing sidewalls extending from said tread and defining an inner annular opening;

an inner annular member carried by each sidewall;

from three to eight elongated wire or cord members arranged symmetrically around and tangential to each said inner annular member; and

reinforcing comprising an integral sidewall rubber composition of higher durometer than the surrounding sidewall rubber, said reinforcing being limited to and completely filling the triangular area between each point of tangency, the inner annular member and the adjacent elongated connecting member.

4,231,409

RADIAL VEHICLE TIRE

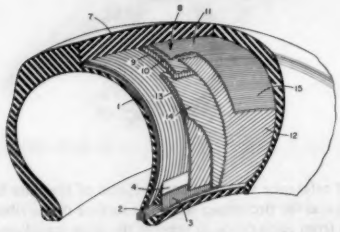
Mario Mezzanotte, Milan, Italy, assignor to Societa Pneumatici Pirelli S.p.A., Milan, Italy

Filed Mar. 22, 1978, Ser. No. 888,999

Claims priority, application Italy, Apr. 7, 1977, 22150 A/77

Int. Cl.³ B60C *15/04, 15/06, 9/02*

U.S. Cl. 152—354 R **10 Claims**



1. A pneumatic tire for vehicle wheels which comprises a carcass comprising at least one layer of cords laying in substantially radial planes, a tread, a breaker arranged between said carcass and said tread and comprising at least two layers of cords made of a material having a tensile strength of at least 260 kg/mm², said cords being parallel to one another in each layer and crossed with respect to those of the adjacent layer and forming an angle ranging between 10° and 35° with respect to the equatorial plane, and at least one strip of textile cords made of a material which shrinks in length when heated, said textile cords being parallel to the equatorial plane and being arranged in a radially outermost position with respect to said layers, said tire comprising, in each sidewall, a reinforcing element comprising at least one layer of reinforcing cords inclined with respect to the circumferential lines of the tire, said reinforcing element extending radially at least from the zone axially adjacent the bead core to a point where its radially outer portion is disposed between said layers and said breaker strip, that portion of said reinforcing element which is disposed between said layers and said strip having a width ranging between 5% and 30% of the breaker width, said reinforcing element being arranged in an axially outermost position with respect to the carcass, said tire being characterized in that it further comprises, in each sidewall at least two layers of cords parallel to each other in each layer and crossed with respect to those of the adjacent layer, said cords forming an angle ranging from 30° to 65° with respect to the circumferential lines, said two layers being arranged between said carcass and said reinforcing element and extending radially from the zone axially adjacent the bead core as far as to extend with their radially outer portion between said carcass and said breaker layers, and in that said reinforcing element has its cords inclined at an angle ranging from 25° to 90°.

4,231,410

PRE-SHAPED PLASTIC REINFORCING MEMBER AND A TIRE ENCAPSULATING SAID MEMBER

Frederick F. Vannan, Jr., Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

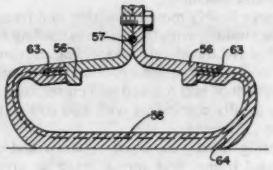
Division of Ser. No. 400,083, Sep. 24, 1973, abandoned, which is a continuation-in-part of Ser. No. 250,702, May 5, 1972, Pat. No. 3,891,740. This application Jan. 28, 1976, Ser. No. 653,166

Int. Cl.³ B60C *5/12, 9/14*

U.S. Cl. 152—356 R **7 Claims**

1. A wheel-tire assembly comprising two wheel members joinable around a seal to form a wheel, said wheel members having a rim portion, said rim portion having a preshaped plastic reinforcing member being encapsulated in an elastomer to form a tire.

3. A unitary preshaped plastic member molded in the shape of a tire and having a series of continuous strands extending



from bead area to bead area, each of said strands being branched to give a wishbone shape.

4,231,411

ROLLER-BLIND ASSEMBLY

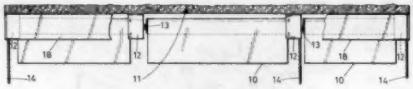
Klaus Hehl, Remscheid-LUM/u/ ttringhausen, and Hans-Jürgen Sauer, Remscheid, both of Fed. Rep. of Germany, assignors to Riloga-Werk Joachim Schmidt, Remscheid, Fed. Rep. of Germany

Filed Jul. 21, 1976, Ser. No. 707,452

Claims priority, application Fed. Rep. of Germany, Jul. 22, 1975, 2532622

Int. Cl.² E06B *9/08*

U.S. Cl. 160—120 **8 Claims**



1. A roller-blind assembly comprising:

two axis-defining shafts each having a pair of ends;

a blind rollable about each of said shafts between its said ends;

three identical hollow housings at and rotatably supporting said ends of said shafts, each of said housings having a pair of opposite axially spaced sides, one of said housings supporting with each of its said sides one end of each of said shafts and the other two housings each supporting with a respective one of their said sides the other end of each of said shafts, each of said housings being formed with a pair of horizontally oppositely open slots;

mechanism inside each of two of said housings each for rotating a respective one of said shafts independently of the other shaft about its axis and thereby winding and unwinding the respective blind; and

a cover plate extending axially along all of said housings and next to both of said blinds and having portions engaged in one of said pair of slots of each of said housings.

4,231,412

FOLDING GARAGE SCREEN DOOR

Eugene F. Nowak, 5826 Broadway, Lancaster, N.Y. 14086

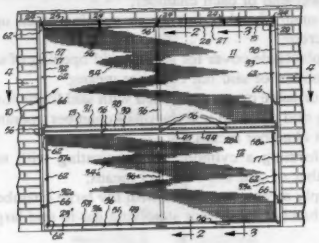
Continuation of Ser. No. 624,790, Oct. 23, 1975, abandoned. This application Oct. 31, 1979, Ser. No. 90,024

Int. Cl.³ E05D *15/26*

U.S. Cl. 160—213 **23 Claims**

1. A screen door construction for placement in a garage door opening having a frame comprising upper screen panel means having an upper edge and a lower edge, lower screen panel means having an upper edge and a lower edge, hinge means connecting said lower edge of said upper panel means to said

upper edge of said lower panel means, and adjuster means proximate said hinge means for permitting the position of said



lower screen panel means to be adjusted relative to said upper screen panel means.

4,231,413

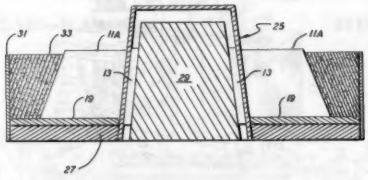
ASSEMBLY FOR AND METHOD OF MAKING MOLD AND CASTING OF ONE-PIECE IMPELLERS

Graham Bretzger, 1105 Skymont Rd., Staunton, Va. 24401

Filed Feb. 27, 1979, Ser. No. 15,589

Int. Cl.³ B22C *7/00, 9/22*

U.S. Cl. 164—15 **13 Claims**



1. A method of preparing an assembly useful in making a mold for casting one-piece impellers comprising:

(a) making a master model for one of the vanes of the impeller in a polished metal having, on the inner end thereof, a shoulder with a height and depth approximately equal twice the width of the vane at its inside edge, said vane being tapered from inside to outside;

(b) preparing from said master model a plurality of identical, flexible vanes from a material selected from the group consisting of flexible rubber and flexible plastic;

(c) forming a member having a truncated conical part containing therein a plurality of slots sized to match the inner edge of the vanes and a base plate having a plurality of slots therein equal in number to the slots in said truncated conical part with said slots in said truncated conical part and said base plate in alignment;

(d) inserting said flexible vanes from inside said truncated conical part through the slots therein with the bottom portion of said vanes in the slots in said base plate; and

(e) inserting inside said truncated conical part a core having a truncated conical shape concentric therewith, said core in abutment with said shoulders on said vanes holding said shoulders in contact with the inside of said truncated conical part.

4,231,414

HANDLING FOUNDRY MATERIALS

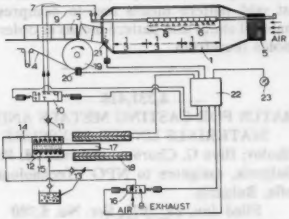
Charles M. G. Wallwork, Church Cottage, Birtles La., Over Alderley, Cheshire, England

Filed May 25, 1978, Ser. No. 909,470

Claims priority, application United Kingdom, May 27, 1977, 22396/77

Int. Cl.³ B22D *29/00*

U.S. Cl. 164—154 **5 Claims**



1. In a foundry moulding installation including a rotatable shake-out drum adapted to receive refractory moulds containing hot metal castings and to break them up, means for feeding moulds intermittently to the drum, and means for delivering cooling water to the interior of the drum, the improvement wherein said water delivery means comprises a reciprocating variable stroke pump, and means responsive to the operation of said intermittent feeding means for starting and stopping said pump in synchronism with the starting and stopping of said feeding means whereby said pump is capable of delivering cooling water to said drum only upon the feeding of moulds into said drum.

4,231,415

APPARATUS FOR THE PRODUCTION OF FOUNDRY SAND MOLDS

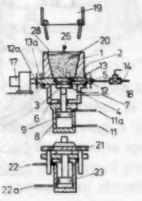
Max Wernli, Schaffhausen, Switzerland, assignor to Georg Fischer Aktiengesellschaft, Schaffhausen, Switzerland

Division of Ser. No. 809,040, Jun. 22, 1977, Pat. No. 4,144,925. This application Dec. 21, 1978, Ser. No. 971,787

Claims priority, application Switzerland, Jun. 25, 1976, 8151/76; May 18, 1977, 6181/77

Int. Cl.³ B22C *15/22, 15/26, 17/08*

U.S. Cl. 164—160 **17 Claims**



1. Apparatus for producing foundry molds comprising vessel means for receiving therein a dosed amount of mold forming material, vacuum means for applying to said vessel means a suction effect to render mold forming material contained within said vessel means into a more cohesive mass, pressure means located adjacent said vessel means for applying a pressurized force to said mold forming material to propel said material out of said vessel means, valve means operatively interposed between said pressure means and said vessel means to control application of said pressurized force to said mold forming material, and pattern means including molding box means for receiving said mold forming material from said vessel means to form a mold therefrom, said valve means operating to block fluid flow between said pressure means and

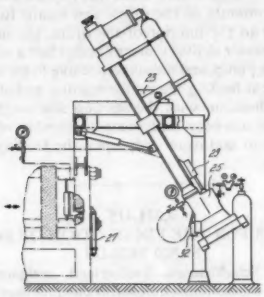
said vessel means while said vacuum means is applying suction to mold forming material contained within said vessel means, said valve means operating to open to permit fluid flow from said pressure means into said vessel means after said vacuum means have ceased applying suction within said vessel means and after said vessel means and said molding box means have been placed in operative relationship to enable transference of said mold forming material from said vessel means into said molding box means, with opening of said valve means operating to cause said pressure means to apply a pressurized force to said mold forming material to propel said mold forming material against said pattern means and to compress said mold forming material about said pattern means in order to form said foundry molds therefrom.

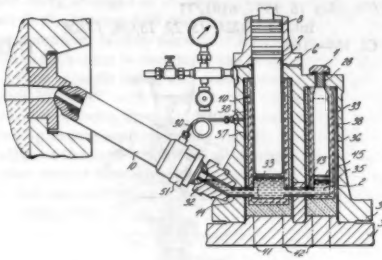
4,231,416

APPARATUS FOR CASTING METALS AND OTHER MATERIALS UNDER PRESSURE

Ivan D. Nikolov; Iliya G. Chorbov, and Ivan M. Peychev, all of Sofia, Bulgaria, assignors to NPO "Technologia Na Metalite", Sofia, Bulgaria

Filed Jan. 23, 1979, Ser. No. 5,780
Claims priority, application Bulgaria, Jan. 25, 1978, 38480
Int. Cl.[3] B22D *17/04*
U.S. Cl. 164—318 **4 Claims**





1. An apparatus for casting a molten material under pressure, comprising:

a support structure receiving a casting mold;

a movable frame pivotally connected to said support structure for tilting movement toward and away from said mold;

a melt-displacing assembly mounted on said frame, said assembling comprising hot chamber means including:

a large chamber, formed in said hot chamber means, having generally upright side walls in a position of said assembly proximal to said mold;

a relatively small chamber, formed in said hot chamber means adjacent said large chamber, having upright side walls in a position of said assembly proximal to said mold; said small chamber being in fluid communication with said large chamber by means of a melt communication passage formed in said hot chamber means at a lower end of each chamber;

said small chamber having an opening at an upper end thereof;

a displaceable cover for sealing said opening of said small chamber of said hot chamber means;

pressurizable means associated with said frame for displacing said cover to seal the small chamber opening of said hot chamber means;

means forming a cylinder communicating with said large chamber of said hot chamber means;

gas supply means, associated with the large chamber of said hot chamber means, for supplying gas to said large chamber;

a piston being reciprocatable in said cylinder to compress said gas and drive molten metal from said large chamber;

a pressing unit mounted on said frame and associated with said piston for displacing said piston in said cylinder; and

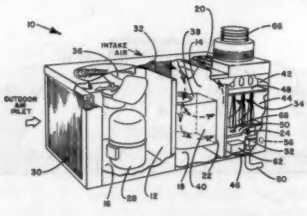
a metal-conducting conduit associated with said hot chamber means for connecting said large chamber with said mold in the position of said assembly proximal to said mold.

4,231,417

METHOD AND APPARATUS FOR REDUCING CORROSION IN A HEAT EXCHANGER

Chester D. Ripka, East Syracuse, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Jun. 1, 1979, Ser. No. 44,449
Int. Cl.[3] F28F *19/00*
U.S. Cl. 165—3 **5 Claims**



1. In combination heating and air conditioning equipment wherein air is passed over a cooling coil during a cooling cycle, creating conditioned air, and during a heating cycle, air is passed over a heat exchanger of the type having walls forming an interior chamber which contain hot gasses during the heating cycle and ambient air during the cooling cycle, the method of reducing corrosion within the heat exchanger during the cooling cycle comprising: Separating a portion of the conditioned air, and forcing the separated portion of the conditioned air into the interior chamber of the heat exchanger to displace high moisture content ambient air, thereby reducing or eliminating condensation formation on the walls of the heat exchanger.

4,231,418

CRYOGENIC REGENERATOR

George P. Lagodmos, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

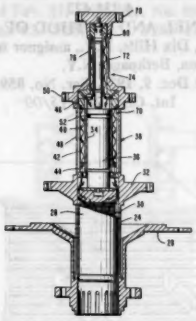
Filed May 7, 1979, Ser. No. 36,894
Int. Cl.[3] F23L *15/02;* **F28D** *17/00;* **F25B** *9/00*
U.S. Cl. 165—4 **15 Claims**

1. A thermal regenerator comprising:

a wall enclosing a regenerator space with an inlet at one end of said wall and an outlet at the other end of said wall to

define a flow direction, grooves in said wall, said grooves having a width, said grooves being oriented at an angle with respect to the flow direction;

regenerator packing positioned within said regenerator and



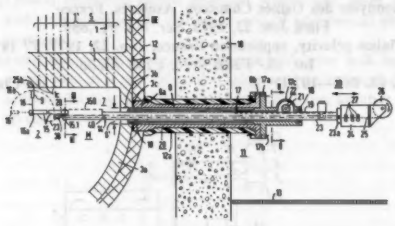
constrained by said walls, said regenerator packing being formed of discrete members which can exchange heat with gas passing through said regenerator packing, said discrete members having a major dimension at least as small as the width of said grooves.

4,231,419

MANIPULATOR FOR INSPECTION AND POSSIBLE REPAIR OF THE TUBES OF HEAT EXCHANGERS, ESPECIALLY OF STEAM GENERATORS FOR NUCLEAR REACTORS

Georg Gugel, Kalchreuth, Fed. Rep. of Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany

Filed Jul. 21, 1978, Ser. No. 926,800
Int. Cl.[2] F28F *11/00*
U.S. Cl. 165—11 A **12 Claims**



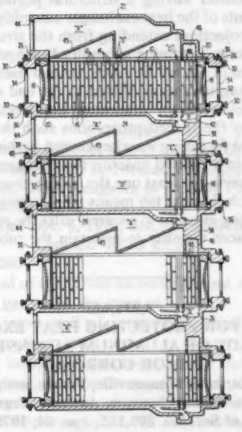
1. Manipulator for inspecting and, if required, repairing the tubes of heat exchangers of steam generators, especially for nuclear reactors, comprising a steam generator having at least one tube bundle set in a tube sheet with the tube endings in the tube sheet having individual tube openings leading into a steam generator chamber, an opening in the steam generator chamber, a lead-in nozzle extending into said steam generator chamber opening, means for bringing-in an inspection arm through the lead-in nozzle into the steam generator chamber, means for withdrawing the inspection arm through the lead-in nozzle, a blind flange for closing off the lead-in nozzle when the inspection arm is withdrawn, a mouthpiece arranged at the free end of the inspection arm, remote control means for aligning the inspection arm with the mouthpiece onto any individual tube opening for engagement with the tube opening whereby inspection instruments and tools such as eddy current probes, cleaning plugs, explosive plugs and the like can be introduced into the tubes through the mouthpiece and removed after the inspection is completed, said inspection arm comprising an elongated guide tube, movably lengthwise, in the lead-in nozzle, a swivel arm at the end of the elongated guide tube supported rotatably in a plane parallel to said tube sheet, an extendable and retractable mouthpiece carrier connected at the end of the swivel arm, and a mouthpiece which can be aligned onto the tube openings disposed on the mouthpiece carrier, with the outer contour of said swivel arm and said mouthpiece carrier in a stretched out transport position for bringing into or withdrawal from the steam generator chamber, not greater than the inner contour of said lead-in nozzle to permit transport therethrough.

4,231,420

HEAT EXCHANGER WITH CONTROLS THEREFOR

J. Hilbert Anderson, York, Pa., assignor to Sea Solar Power, York, Pa.

Filed Nov. 20, 1978, Ser. No. 962,104
Int. Cl.[3] B60H *1/00*; F28F *7/00, 3/00*; F25B *41/04*
U.S. Cl. 165—40 **20 Claims**

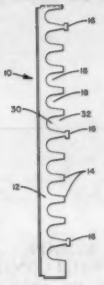


10. A boiler module or unit comprising a plurality of heat exchangers stacked on top of each other as a unitary vertical assembly, each heat exchanger having a plurality of plates arranged in pairs in vertical planes and in spaced parallel relation to one another between a plurality of pressure plates, each pair of plates defining a passageway therebetween and each pair of plates defining a passage between adjacent pairs of plates, a cover member for the top of the uppermost heat exchanger of said stack, a cover member for the bottom of the lowermost heat exchanger of said stack, a cover member for the bottom of each remaining heat exchanger of said stack with said bottom cover constituting top covers for each subjacent heat exchanger of said stack, said top cover and said bottom cover and each intermediate bottom cover terminating in offset projections, fastening means securing said projections to one another in vertical compression and fastening means carried by said projections and engaging said pressure plates for forcing said plates towards one another in horizontal compression contemporaneous with retaining each heat exchanger in an assembled condition.

4,231,421
WOUND FIN HEAT EXCHANGER SUPPORT

Burrows P. Eaton, Camillus, and William Wright, East Syracuse, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Dec. 1, 1978, Ser. No. 965,622
Int. Cl.[3] F28F 9/00
U.S. Cl. 165—68 3 Claims



1. A combination support and retainer for heat exchanger assembly utilizing wound fin tubing and having a base and top cover as components thereof which comprises:

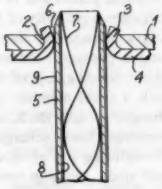
a spacer member having a structural portion for securing components of the heat exchanger assembly and a series of spaced projections extending from the structural portion, the projections defining generally U-shaped openings for the receipt of wound fin tubes, at least one of said projections having tab means affixed to the end thereof;

a retainer element for enclosing the U-shaped openings defined by the spaced projections such that a portion of the wound fin tubing may be secured within each opening to maintain a desired spacing therebetween, the retainer element having at least one slot which coacts with the tab means such that the tab means may be twisted relative to the retaining element to securely affix the retainer element to the spacer member to maintain the tubing within the openings.

4,231,422
METHOD FOR PROTECTING HEAT EXCHANGER TUBES MADE OF ALUMINUM AGAINST EROSION AND/OR CORROSION

Jean-Pierre Moranne, Franconville, France, assignor to Societe Anonyme des Usines Chausson, Asnieres, France

Continuation of Ser. No. 899,155, Apr. 24, 1978, abandoned.
This application Sep. 20, 1979, Ser. No. 76,986
Claims priority, application France, May 6, 1977, 77 13968
Int. Cl.[3] F28F 19/06, 9/06
U.S. Cl. 165—69 4 Claims

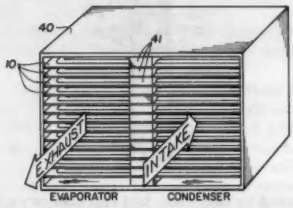


1. Heat exchanger comprising tubes made of an aluminum containing alloy, a perforated tube plate forming tube passages in which are mounted the tubes, elastomeric tightness sockets inserted between said tubes and said tube passages, said tubes having an inner surface and an outer surface with at least one of the inner surface and outer surface being coated with a layer of aluminum-silicon alloy containing from 5 to 12% silicon.

4,231,423
HEAT PIPE PANEL AND METHOD OF FABRICATION

Robert A. Haslett, Dix Hills, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Dec. 9, 1977, Ser. No. 859,002
Int. Cl.[3] F28D 15/00
U.S. Cl. 165—105 4 Claims

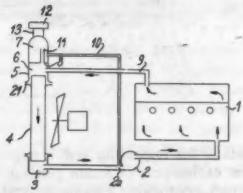


1. A heat exchanger assembly comprising a housing having a plurality of interior panel support members within a substantially open internal construction and, a plurality of flat sheet heat transfer units mounted on said support members, each of said units including a pair of flat sheets wherein at least one of said sheets includes a plurality of spaced parallel furrows, an integral manifolding channel in fluid communication with said furrows and a common fluid charging port connecting to said manifolding channel, said furrows being sealed off from said manifolding channel after charging to form a plurality of independently operative heat pipes.

4,231,424
HEADER CONSTITUTING A PRESSURIZING TANK

Jean-Pierre Moranne, Franconville, France, assignor to Societe Anonyme des Usines Chausson, Asnieres, France

Filed Jun. 23, 1978, Ser. No. 917,859
Claims priority, application France, Jun. 22, 1977, 77 19102
Int. Cl.[3] F28B 9/10; F28F 13/06
U.S. Cl. 165—107 D 15 Claims



1. A header forming a pressurized tank comprising:

a peripheral shoulder;

inside partition means dividing the header into a first compartment and a second compartment, said second compartment being on upper part of the header and said inside partition means including edge cooperating with corresponding said peripherial shoulder of the header, said edge forming a stop preventing any pivoting of said partition inside the header; circuit means for bringing to the header a liquid to be cooled;

a pump for circulating the liquid;

a tubing connecting said first compartment to said circuit means; and

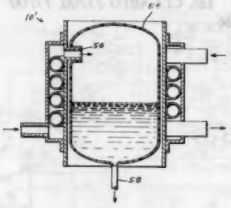
a pressurizing tubing connecting said second compartment to inlet of the pump.

4,231,425

EXTRACORPOREAL CIRCUIT BLOOD HEAT EXCHANGER

William R. Engstrom, 17 Willow St., Belmont, Mass. 02178

Filed Feb. 27, 1978, Ser. No. 881,392
Int. Cl.[3] F28D 7/02; F28F 9/22
U.S. Cl. 165—156 6 Claims



1. A heat exchanger for use in an extracorporeal blood circuit, or the like, comprising

(a) a housing of a clear, transparent material,

(b) said housing including walls forming a portion of a helical passage for the flow of blood therethrough,

(c) a tubular conduit mounted to and passing through said housing for the flow of a heat exchange medium therethrough,

(d) the exterior of said conduit forming another portion of said helical passage whereby blood flowing through said helical passage will be in direct contact with said conduit,

(e) said housing including a cylindrical inner wall and a cylindrical outer wall spaced from the inner wall to define an annular chamber therebetween,

(f) said conduit being in the form of a helix and mounted in said chamber, each convolution of said conduit being in contact with the inner and outer walls and spaced from adjacent convolutions to define said helical passage, and,

(g) blood receiving means disposed within said inner wall and connected to the discharge end of said helical blood passage,

(h) said inner wall being tubular and said outer wall being comprised of a pair of cooperating semi-cylindrical shell sections having end flanges and joined to one another and to said inner wall.

4,231,426

METHOD OF USING TRACER FLUIDS FOR ENHANCED OIL RECOVERY

Walter H. Carter, Houston, and Jerry L. Sides, Stafford, both of Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed May 9, 1979, Ser. No. 37,588
Int. Cl.[2] E21B 43/22, 47/00
U.S. Cl. 166—252 16 Claims

1. In a method for determining flow conditions between spaced-apart wells penetrating and in fluid communication with the subterranean formation comprising injecting a predetermined quantity of an aqueous liquid having dissolved therein a known concentration of a tracer material subject to bacterial attack, wherein the improvement for reducing the rate of bacterial attack of the tracer comprises:

incorporating a bactericidially effective amount of an aromatic treating compound into the aqueous liquid containing the tracer.

4,231,427

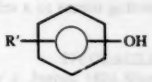
SURFACTANT WATERFLOODING OIL RECOVERY METHOD

George Kalfoglou, Houston, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Dec. 15, 1978, Ser. No. 969,919
Int. Cl.[2] E21B 43/22
U.S. Cl. 166—275 14 Claims

1. A method for recovering petroleum from a subterranean, permeable, petroleum-containing formation penetrated by at least one injection well and by at least one production well, by a surfactant waterflooding method comprising injecting an aqueous surfactant-containing fluid into the formation via the injection well, said surfactant comprising an alkylpolyalkoxyalkylene sulfonate or an alkylarylpolyalkoxyalkylene sulfonate, said fluid displacing petroleum through the formation to the producing well where it is recovered to the surface of the earth, where the improvement for increasing the viscosity and phase stability of the aqueous surfactant fluid, and decreasing the amount of surfactant retained by the formation, comprises:

incorporating in the surfactant fluid, an effective amount of a mixture of a C_1 to C_8 alkanol and a phenol having the following formula:



wherein R′ is hydrogen or a linear or branched alkyl having from 1 to 8 carbon atoms.

4,231,428

WELL TREATMENT METHOD

Riley B. Needham; Charles P. Thomas, and Donald R. Wier, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 4, 1978, Ser. No. 966,458
Int. Cl.[2] E21B 43/26
U.S. Cl. 166—280 8 Claims

1. In a method of fracturing an underground zone or formation in oil and gas wells, the steps of

(a) injecting into a well a fracturing fluid to form a fracture in said formation,

(b) injecting into said formation a carrier fluid having suspended therein a proppant composed of particles coated with an organo-silicon compound prepared by dissolving the organo-silicon compound in a solvent therefor, admixing the resultant solution with particulate material, and thereafter evaporating the solvent to form a silicon-coated particulate material, and

(c) closing the well and maintaining the injection pressure on the formation until the fracture approaches the normal formation pressure.

4,231,429

LATERAL TENSIONING SYSTEM FOR RISER PIPE

Miroslav M. Kolpak, Tulsa, Okla., assignor to Standard Oil Company (Indiana), Chicago, Ill.

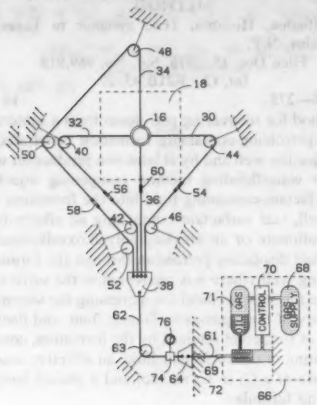
Filed Dec. 26, 1978, Ser. No. 973,257
Int. Cl.[3] E21B 7/12
U.S. Cl. 166—362 5 Claims

5. A method for limiting the lateral stress on a member extending vertically in an opening of a floating vessel supported on a body of water which comprises:

attaching one end of each of a plurality of cables at equally spaced points on the periphery of said member;

connecting the other end of each cable to a common collector;

attaching the collector to connecting means attached to said floating vessel; and



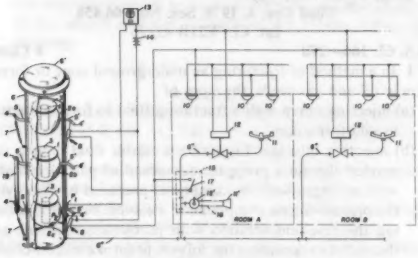
limiting the tension on said connecting means to a selected maximum.

4,231,430

AUTOMATIC SODA-ACID FIRE EXTINGUISHER SYSTEM

Dong J. Byun, 719-7, Chunghung-dong, Dong-Ku, Kwangju, Chunla Namdo, Rep. of Korea

Filed Oct. 23, 1978, Ser. No. 953,746
Int. Cl.³ A62C *35/04*
U.S. Cl. 169—57 **1 Claim**



1. An automatic fire extinguishing system, comprising:

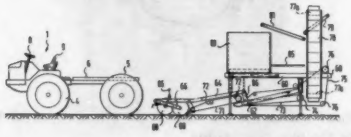
a cylindrical reaction chamber having several bottle assemblies located therein, said bottle assemblies comprising an external bottle and an internal bottle and each of the bottles containing chemicals and being supported inside the reaction chamber by at least one axle having lever arms extending from the opposite ends of the at least one axle, wherein the free end of one lever arm is connected to the outside of the chamber by a vinyl string having a selectively energizable electrical filament assembly, with the free end of the other lever arm being connected to the outside of the chamber by a coil spring, and means for energizing said electrical filament such that, when said filament is energized, the vinyl string is cut and the bottles are turned downwardly and the chemicals in the bottles are poured out on the bottom of the reaction chamber and the extinguishing gas and water produced by the reaction of the chemicals are conducted by supply means to a spray nozzle located proximate the fire.

4,231,431

DETACHABLE HARVESTING UNIT

Ernst Weichel, P. O. Box 1180, 7326 Heiningen, Fed. Rep. of Germany

Division of Ser. No. 612,741, Sep. 12, 1975, Pat. No. 4,078,626.
This application Jan. 11, 1978, Ser. No. 868,543
Claims priority, application Fed. Rep. of Germany, Sep. 13, 1974, 2443915
Int. Cl.³ A01D *13/00, 17/00*
U.S. Cl. 171—46 **6 Claims**

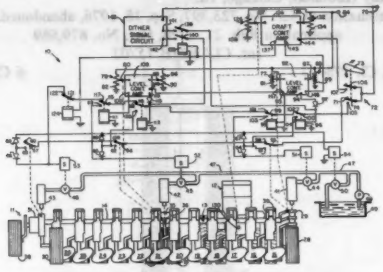


1. An agricultural machine comprising a main frame, power means, a front axle, a rear axle, said front and rear axles located below said main frame, at least one working device, at least four attachment positions on said main frame for the reception therein of said at least one working device, means for detachably mounting said at least one working device in at least one of said four attachment positions, said at least four attachment positions comprising a first position located in front of said front axle, a second attachment position located behind said rear axle, a third attachment position located between said rear axle and said front axle and below said main frame, and a fourth attachment position located behind said front axle and above said main frame, two front wheels spaced laterally apart on said front axle and two rear wheels spaced laterally apart on said rear axle, at least one front take-off shaft connected to and driven by said power means, at least one rear take-off shaft connected to and driven by said power means, and at least one lateral take-off shaft located between said front take-off shaft and said rear take-off shaft, said at least one working device having a width at least equal to the lateral spacing between said front wheels and between said rear wheels, and means including power elevators for operating said at least one working device, said means for detachably mounting comprising an apparatus frame mounted on said main frame with the rear end of said apparatus frame located rearwardly from said main frame and the front end thereof located in said fourth attachment position rearwardly of and adjacent to said front axle, said machine comprises four said working devices said four working devices being supported from said apparatus frame as a unit so that said four working devices can be detached from said main frame, said four working devices comprises a harvesting means mounted in said first attachment position, a vertical conveyor bucket chain mounted at the rear end of said main frame in said second attachment position, a container member comprising at least one bunker mounted in said fourth attachment position, an oscillating frame dependently and vertically adjustably supported in said third attachment position from said apparatus frame and extending therefrom into said first attachment position where said oscillating frame is attached to said harvesting means and means mounted in said third attachment position and supported from said oscillating frame for connecting said harvesting means and said conveyor bucket chain whereby the harvesting, cleaning, separating, screening, conveying and collecting of a crop, such as potatoes, can be achieved.

4,231,432
POSITION AND DRAFT CONTROL SYSTEM FOR PLOWS

Marvin D. Jennings, Hendersonville, N.C., assignor to International Harvester Company, Chicago, Ill.

Filed Sep. 22, 1978, Ser. No. 945,146
Int. Cl.³ A01B 63/112
U.S. Cl. 172—7 15 Claims



1. In a control system for a plow including frame means arranged to extend angularly from a forward end to a rearward end, a plurality of plow bottoms carried by said frame means, first wheel means for supporting a first portion of said frame means and second wheel means for supporting a second portion of said frame means spaced rearwardly from said first portion, power source means, and first and second electrically controllable level control means supplied with power from said power source means for effecting changes in the elevation of said first and second portions of said frame means with respect to said first and second wheel means, first and second level control circuits electrically coupled to said first and second level control means, each of said circuits having first and second inputs and being operative to apply signals to the corresponding level control means to raise and lower the corresponding portion of said frame means in accordance with the difference between signals applied to said first and second inputs, first and second adjustable means coupled to said first inputs to apply signals of adjustable magnitude thereto, first and second position sensing means mechanically coupled to said control means and electrically coupled to said second inputs to apply signals to said second inputs corresponding to the levels of said first and second portions of said frame means, and control circuit means for preventing operation of one of said level control means at any time when the other of said level means is operative in performing either a raising or a lowering operation to thereby prevent simultaneous operation on both of said level control means and to thereby minimize the load on said power source means.

4,231,433
CULTIVATOR WITH TOOL SUPPORT ARM AND LATCH FOR HOLDING SAME IN RAISED NON-WORKING POSITION

Carroll J. Whitfield, and Anthony W. Lastinger, both of Tifton, Ga., assignors to Kelley Manufacturing Co., Tifton, Ga.

Filed Sep. 11, 1978, Ser. No. 941,067
Int. Cl.³ A01B 65/06
U.S. Cl. 172—662 1 Claim

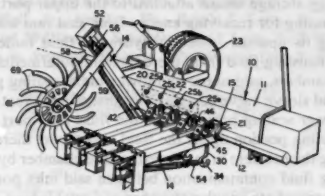
1. In a cultivator including an elongated tool bar extending generally transverse to the normal direction of travel of the cultivator, at least one cultivating element mounted from a longitudinally extending tool support arm, the combination therewith of:

(a) connector means for connecting said tool support arm to said tool bar comprising a pair of jaw members disposed to clamp about the tool bar,

(b) adjustable closing means associated with said pair of jaw members for selectively providing engagement of said pair of jaw members with said tool bar,

(c) pivot means joining said tool support arm to said pair of jaw members for movement about a transverse axis,

(d) latching means comprising a locking post extending from said pair of jaw members,



(e) said locking post comprising the upper end of a shaft extending through said pair of jaw members,

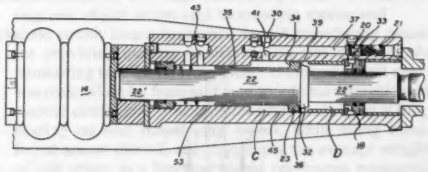
(f) means for securing said pivot means to said shaft, and

(g) a spring mounted on said tool support arm constructed and arranged to engage said locking post when said tool support arm is raised thereby to hold the tool support arm in raised, non-working position.

4,231,434
HYDRAULIC IMPACT DEVICE

Edgar J. Justus, 1826 Sherwood Dr., Beloit, Wis. 53511

Filed Feb. 21, 1978, Ser. No. 879,216
Int. Cl.³ B25D 9/02; F01B 7/18
U.S. Cl. 173—119 6 Claims



1. A hydraulic impact device comprising a housing having a cylindrical bore comprising an upper and a lower portion, said upper portion having a diameter smaller than the diameter of the lower portion,

upper and lower bearing means mounted in the upper and lower end portions of said cylindrical bore respectively,

a ram member reciprocally disposed in said housing having upper and lower portions sealingly received in said upper and lower bearing means respectively, said ram member including a piston portion having a diameter smaller than the diameter of the lower portion of said cylindrical bore to permit fluid to bypass the piston within the cylindrical bore,a sleeve valve reciprocally disposed in the cylinder bore, said sleeve valve having a small diameter upper radial outer sealing portion for sealingly engaging the diameter of said upper portion of said cylindrical bore and having a large diameter lower radial outer sealing portion for sealingly engaging the diameter of said lower portion of said cylindrical bore, said sleeve valve further including a lower annular sealing portion for sealingly engaging the upper annular portion of said piston portion thereby dividing said cylindrical bore into upper, intermediate and lower annular chambers,

a hydraulic fluid inlet port for supplying high pressure fluid to said intermediate chamber to force said lower annular sealing portion into sealing engagement with the upper annular portion of said piston portion,

a pressure relief valve positioned between said high pressure fluid inlet port and a lower hydraulic fluid inlet port for delivering to the lower annular chamber a presure lower

than the pressure in said intermediate annular chamber so as to effect a force bias of said sleeve valve toward said piston portion and to divert oil flow to the intermediate annular chamber when the pressure in said intermediate annular chamber is reduced thereby returning said sleeve valve to sealing engagement with said piston portion,

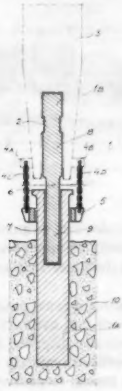
energy storage means attached to the upper portion of said housing for receiving energy from said ram member during its upward stroke, a hydraulic fluid outlet port for exhausting fluid from the upper and intermediate annular chambers, said upper and lower radial sealing portions of said sleeve valve being axially spaced such that when said lower sealing portion seals the fluid inlet port the upper sealing portion opens the fluid outlet port thereby reducing the pressure in said intermediate chamber by interrupting fluid communication between said inlet port and said intermediate annular chamber and establishing fluid communication between said outlet port and said intermediate annular chamber thereby unseating the sleeve valve and permitting said ram member to be driven downwardly by said energy storage means.

4,231,435

TOOL FOR USE PRIMARILY IN CONJUNCTION WITH A ROCKBREAKER UNIT

Lars I. Andreasson, Söderdalsgatan 48, 502 54 Boras, Sweden

Filed May 19, 1978, Ser. No. 907,462
Claims priority, application Sweden, May 27, 1977, 7706280
Int. Cl.[2] B23B *31/00, 5/22*
U.S. Cl. 173—128 **4 Claims**



1. A tool for use in connection with a rockbreaker unit comprising

(a) a first substantially elongate member,

(b) a second substantially elongate member, said second substantially elongate member having a central recess at one end and an external abutment at the same end, and

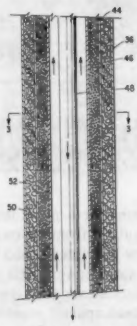
(c) a third member, said third member being a body having an aperture mating with the external circumference of said second substantially elongate member, said first substantially elongate member being carried by said rockbreaker unit in such manner as to project partially out of said unit for extending into said recess in said second substantially elongate member with its projecting portion, and said third member being suspended by chains secured to said rockbreaker unit and surrounding said second substantially elongate member, said third member being slidable along the exterior of said second substantially elongate member for engaging said external abutment thereof in consequence of said chains being drawn taut by relative displacement of said rockbreaker unit with regard to said second substantially elongate member.

4,231,436

MARINE RISER INSERT SLEEVES

Michael R. Waller, Tulsa, Okla., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Continuation of Ser. No. 723,397, Sep. 15, 1976, abandoned. This application Feb. 21, 1978, Ser. No. 879,669
Int. Cl.[2] E21B *15/02*
U.S. Cl. 175—7 **6 Claims**



1. A method of operation in a body of water using an offshore floating drilling structure and a subsea well in which drilling mud is used and which comprises:

connecting a riser pipe between said floating drilling structure and said well;

maintaining tension on said riser pipe;

drilling a hole by operations conducted through said riser pipes;

running a first string of casing through said riser pipe and setting it in said hole;

running a sleeve insert having an exterior diameter along substantially its entire length which is only slightly less than the internal diameter of said riser pipe and a density only slightly greater than that of said water in said riser with its lower end above said subsea well to effectively reduce the volume of space in said riser pipe and to effectively reduce the tension to be maintained on said riser pipe; and

continue drilling operations through said sleeve insert and said first string of casing.

4,231,437

COMBINED STABILIZER AND REAMER FOR DRILLING WELL BORES

Gerald S. Swersky, and Keith J. Mason, both of Edmonton, Canada, assignors to Christensen, Inc., Salt Lake City, Utah

Filed Feb. 16, 1979, Ser. No. 12,667
Int. Cl.[3] E21B *9/24, 17/10;* E21C *9/00*
U.S. Cl. 175—325 **12 Claims**

1. Stabilizer and reamer apparatus for drilling a well bore, comprising a one-piece body having a fluid passage therethrough, upper coupling means and lower coupling means at the upper end portion and lower end portion, respectively, of said body for securing said body in a tubular drill string, said body including an upper stabilizer section and a lower reamer section adjoining said stabilizer section, elongate circumferentially spaced stabilizer pads secured to said stabilizer section against movement with respect thereto to center said body in

the well bore, the lower ends of said pads adjoining the upper end of said reamer section, and circumferentially spaced

reamer cutter means carried by said lower reamer section for reaming the well bore.

4,231,438

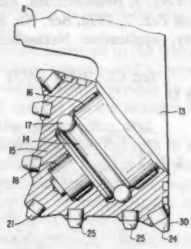
STRAIGHT HOLE INSERT DRILL BIT

Lloyd L. Garner, San Clemente, and Charles R. Harris, Whittier, both of Calif., assignors to Smith International, Inc., Newport Beach, Calif.

Continuation of Ser. No. 824,519, Aug. 15, 1977, abandoned. This application Oct. 10, 1978, Ser. No. 949,783

Int. Cl.[2] E21B *9/10*

U.S. Cl. 175—353 **2 Claims**



1. A rotary drill bit comprising:

a main body having a plurality of legs extending downwardly therefrom, each leg having an inwardly extending journal formed thereon, and

a cone shaped cutter rotatively supported on each journal, the peripheral surface of each cutter having a plurality of annular rows of outwardly projecting cutting inserts mounted thereon with the outermost row of cutting inserts from the cone vertex forming the gage cutting row, at least one cone is configured to have the gage cutting row of inserts having a diameter larger by substantially 10% than that of the adjacent intermediate annular row of inserts, thereby enabling the extended gage row to produce a sharp corner between the borehole wall and bottom, each said cone including a heel portion adjacent said gage row, said heel portion having an outer surface parallel to the outer surface of said leg, each of said gage inserts including a cutting face parallel to the outer surface of said heel portion, each of said cones having its peripheral surface roll on the bottom of the borehole and being configured to have the gage cutting row of inserts extending downwardly further than the other annular rows of inserts thereby cutting an annular area on the borehole bottom lower than the area cut by the inner annular rows of inserts.

4,231,439

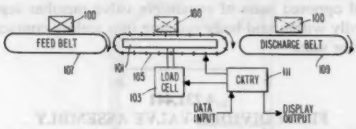
AUTOMATIC CHECK WEIGHER

James F. Hall, Jr., Ardsley, Pa.; Ralph J. Lake, Jr., Maple Shade, and William G. Scholder, Budd Lake, both of N.J., assignors to Franklin Electric Subsidiaries, Inc., Levittown, Pa.

Filed Apr. 23, 1979, Ser. No. 32,213

Int. Cl.[3] G01G *19/04, 19/52, 23/10*

U.S. Cl. 177—25 **15 Claims**



1. An automatic weighing machine capable of weighing an object as it passes through said machine, "on-the-fly," and checking that weight against a predetermined weight value entered thereon, comprises:

a transducing means for providing an electric circuit characteristic as a function of bearing weight;

means associated with said transducing means for feeding said object onto said transducing means;

discharge means associated with said transducing means for carrying said object away from said transducing means;

means connected with said transducing means for transferring said object across said transducing means; and

electric circuit means connected to said transducing means for providing electric power thereto, for continuously monitoring said transducing means electrical circuit characteristic whereby from said monitored characteristic said electric circuit means determines when said object is fully bearing on said transducing means, while being transferred across thereof, and determines the average weight of said object as a function of said continuous monitored characteristic.

4,231,440

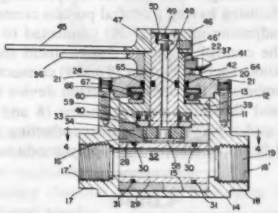
ROTARY, SEGMENTED, EXPANSIBLE VALVES

Robert L. Erwin, Farmington, N. Mex., assignor to J. D. Kinsey, Farmington, N. Mex., a part interest

Filed May 21, 1979, Ser. No. 41,069

Int. Cl.[3] F16K *3/36*

U.S. Cl. 137—246.22 **13 Claims**



1. A valve including a body having a fluid passage and a body opening intersecting said passage, said body opening being defined by an encompassing body wall, a valve member rotatably mounted in said body opening and divided into four expansible segments, two of said segments being opposed and forming one opposed pair, the other two of said segments being opposed and forming another opposed pair, said valve

member having an opening to register with said fluid passage, said valve member opening extending through one opposed pair of said segments, the other opposed pair of said segments being solid and forming fluid stops when registered with said fluid passage, a tube lining said valve member opening, said one pair of opposed segments being slidably mounted on said tube, fluid sealing means for sealing each segment of said one opposed pair of segments with respect to said tube, means for rotating said valve member to register said valve member opening with said fluid passage in the open condition of said valve and to register said other pair of solid valve member segments with said fluid passage in the closed condition of said valve, valve seats surrounding said fluid passage on opposite sides of said valve body opening means for selectively expanding said opposed pairs of expansible valve member segments outwardly within said body opening into sealing contact with said valve seats.

4,231,441

FLOW DIVIDER VALVE ASSEMBLY

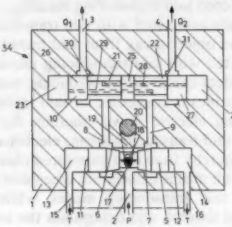
Dieter Burckhardt, Schwäbisch Gmünd, Fed. Rep. of Germany, assignor to Zahnradfabrik Friedrichshafen AG., Friedrichshafen, Fed. Rep. of Germany

Filed Nov. 21, 1978, Ser. No. 962,631

Claims priority, application Fed. Rep. of Germany, Nov. 16, 1977, 2751082

Int. Cl.³ B62D *11/00*

U.S. Cl. 180—6.48 **5 Claims**



1. A flow divider valve assembly having an inlet (2), distributor outlets (3 and 4), a valve housing (1) connected to the inlet and outlets, an operating piston device (10) within the valve housing including pressure chambers (21 and 22) respectively connected by restricted passages (30 and 31) to the distributor outlets, compensating chamber means (23 and 24) connected to said pressure chambers for shifting the operating piston device to maintain a constant ratio between the flow rates of the divided flow streams delivered to said distributor outlets, the improvement residing in a control valve (5) floatingly mounted in the valve housing having a central portion connected to the inlet, valve adjusting means (17-20) connected to the central portion of the control valve for displacement thereof to an adjusted position, supply conduits (8 and 9) connecting the two pressure chambers of the operating piston device to said control valve, and throttling passage means (6 and 7) located upstream of said supply conduits for conducting the divided flow of fluid from the inlet to the supply conduits.

4,231,442

APPARATUS FOR BRAKING A TRAIN OF VEHICLES

Mogens Birkeholm, Kagsaavej 59, 2730 Herlev, Denmark

Continuation-in-part of Ser. No. 786,565, Apr. 11, 1977, Pat. No. 4,113,041, which is a continuation of Ser. No. 584,029, Jun. 5, 1975, abandoned. This application Aug. 18, 1978, Ser. No. 934,983

Int. Cl.³ B60T *7/20*

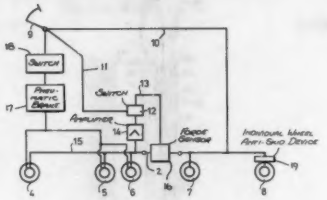
U.S. Cl. 180—14 R **7 Claims**

1. Apparatus for braking a train of vehicles including a tractor vehicle and at least one trailer vehicle, the apparatus comprising:

braking means for at least the rear wheels of the rearmost trailer vehicle in the train of vehicles;

control means located in the tractor vehicle and operable by an operator in said tractor vehicle for actuating only said braking means for the rearmost trailer vehicle;

separate braking means for each vehicle in the train other than the rearmost trailer vehicle;



means for actuating the braking means for each other vehicle in response only to a positive tension force between said other vehicle and the next following trailer vehicle in the train; and

separate switch means for said each other vehicle, each of said switch means being actuated by the control means for enabling operation of the corresponding means for actuating the braking means for said each other vehicle only when said control means is operated to actuate the braking means of the rearmost trailer vehicle.

4,231,443

OVERLOAD COUPLINGS

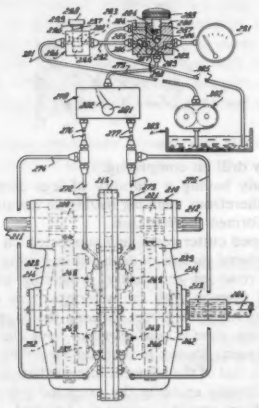
Cornelis van der Lely, 7, Brüschenrain, Zug, Switzerland

Filed Feb. 7, 1978, Ser. No. 875,946

Claims priority, application Netherlands, Feb. 11, 1977, 7701445

Int. Cl.³ B60K *17/28*

U.S. Cl. 180—53 D **22 Claims**



1. A tractor comprising driving means including a power takeoff shaft that has a coupling connectable to a driven shaft member, said coupling having two relatively moveable parts that are normally connected by locking means, said locking means comprising at least one displaceable latch in a closed hydraulic system and said latch being displaced upon overload to allow relative movement between said parts, said system

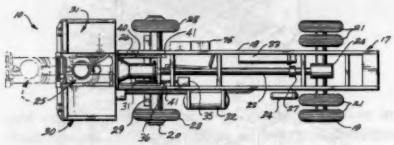
including a closed space for hydraulic fluid and said latch having a part that normally divides said space into two portions, duct means in said latch part that communicates hydraulic fluid from one portion to the other upon overload, the volume of the space remaining substantially unchanged and the latch being displaced against the pressure in said system upon overload.

4,231,444

MECHANICAL INTERFACES FOR CONTROL LINKAGES IN A REMOVABLE VEHICLE ENGINE MODULE

George O. Telesio, 7709 S. Milna Ave., Whittier, Calif. 90601

Filed Aug. 28, 1978, Ser. No. 937,108
Int. Cl.³ B60K *5/10*
U.S. Cl. 180—294 **7 Claims**



1. A vehicle comprising
(a) a chassis including a frame, drivable ground engaging traction means mounted to the frame, and drive means coupled to the traction means and connectible to an engine for driving the traction means in response to operation of the engine,
(b) an engine, a transmission, and a support for the engine and the transmission, the engine including an accelerator control linkage and the transmission including a shift linkage,
(c) means mounting the engine support to the frame for substantially linear movement of the support into and out of an operative position in which the engine is connected to the drive means,
(d) an operator's station mounted to the frame and including an accelerator linkage actuator and a transmission linkage actuator, the actuators being operable by a vehicle operator to direct and control via the linkages the operation of the engine and the transmission, and
(e) mechanical couplings in the linkages in association with the operative position of the support for automatically dissociating upon movement of the support out of its operative position and for automatically operatively associating upon movement of the support into its operative position, the coupling in the transmission shift linkage including means for positively following and transmitting in a push-pull manner to the transmission motion of the transmission linkage actuator.

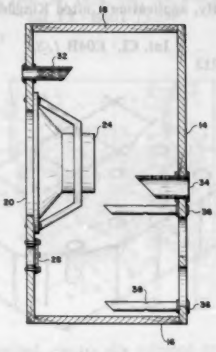
4,231,445

ACOUSTIC LENS SPEAKER CABINET

Rubein V. Johnson, 2432 Court St., Muskogee, Okla. 74401

Filed Dec. 4, 1978, Ser. No. 966,503
Int. Cl.³ G10K *13/00*; H05K *5/00*
U.S. Cl. 181—148 **6 Claims**

1. A cabinet for improving the sound output of an amplifier, comprising:
an upright housing having a front portion and a rear portion, the front portion having one or more baffle openings;
a speaker contained within the housing and mounted on the front for outward projection of sound, the speaker having a vibrational area equal to k, the speaker having means for connecting to the output of an amplifier; and
at least one wave guide sound lens, the sound lens in the form of a tubular member of selected length positioned co-axially in said baffle openings, the axis of the tubular member being horizontal and perpendicular to said front portion, the forward or exposed end of the tubular member being closed, the forward end in cross-section being concave-convex with the radii of curvature being selected



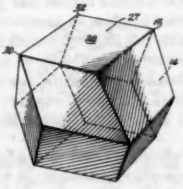
so that the forward portion at the tubular axis is thin while the outer portions beyond the tubular axis thickens to equal at least the wall thickness of the tubular member.

4,231,446

RESONATING CHAMBER

Thomas R. Weiss, and Matthew R. Kennedy, both of Crystal River, Fla., assignors to Tesserax Inc., Homosassa Springs, Fla.

Continuation-in-part of Ser. No. 876,012, Feb. 8, 1978, abandoned. This application Apr. 2, 1979, Ser. No. 26,443
Int. Cl.³ H05K *8/00*
U.S. Cl. 181—148 **14 Claims**



1. In an acoustical reproducing apparatus having a resonating chamber and a speaker means mounted in said resonating chamber, the improvement comprising:
said resonating chamber including a plurality of parallelogram-shaped panels,
each said parallelogram-shaped panel having pairs of opposed corner angles of approximately 70° and 110°,
each said parallelogram-shaped panel disposed in a plane forming an approximate 120° angle with each of the adjacent said rhombus-shaped panels,
each said parallelogram-shaped panel being formed of relatively thin substantially non-sound absorbing material and having an interior surface which is planar and unpadded.

4,231,447

MULTI-LAYER ACOUSTIC LININGS

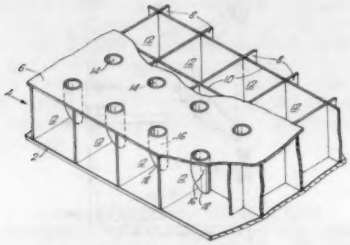
John F. Chapman, Solihull, England, assignor to Rolls-Royce Limited, London, England

Filed Mar. 20, 1979, Ser. No. 22,177

Claims priority, application United Kingdom, Apr. 29, 1978, 17148/78

Int. Cl.³ E04B *1/82*

U.S. Cl. 181—213 **5 Claims**



1. For a fluid-flow duct in a gas turbine engine, a multi-layer acoustic lining comprising an air-impermeable backing layer, a compartmented-airspace core structure, a core facing layer overlying said core structure and incorporating apertures having predetermined cross-sections through which sound energy can enter the core, and tube-like Helmholtz resonator necks having bodies with cross-sections substantially the same as the cross-sections of said apertures which extend from said apertures into said core structure such that an end of each resonator neck is situated within a core compartment and spaced from walls thereof to thereby render core compartments effective as Helmholtz resonators; wherein the improvement is that said end of each resonator neck within said core structure is a biased configuration such that said end lies in a plane extending at an acute angle with the body of said neck.

4,231,448

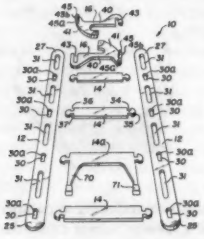
DEMOUNTABLE BOAT LADDER

Svend O. Jensen, 1554 Farrell Crescent, Delta, British Columbia, Canada V4L 1T8

Filed Aug. 6, 1979, Ser. No. 64,302

Int. Cl.³ E06C *1/36, 1/38, 7/50*

U.S. Cl. 182—93 **8 Claims**



1. A boarding ladder for a boat comprising:

a pair of parallel side rails,

a plurality of treads extending between the side rails,

connecting means securing opposite ends of the treads to the side rails for ready connection and disconnection,

a pair of hangers each having a first portion adjacent one of the side rails and a second portion disposed substantially at right angles to said first position to project rearwardly of the ladder,

attachment means releasably securing the hangers to the side rails and one of the treads, and

anchoring means detachably securing rear ends of the second portions to the boat whereby to suspend the ladder alongside the boat.

4,231,449

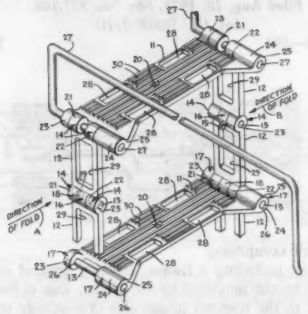
FOLDABLE LADDER

Joseph N. Laurita, 69-03 62 Rd., Middle Village, N.Y. 11379

Filed Apr. 28, 1976, Ser. No. 681,029

Int. Cl.² E06C *1/36, 1/383*

U.S. Cl. 182—164 **1 Claim**



1. A foldable ladder of the type having a plurality of rigid steps and being operable between an operating position in which said ladder is suspended from an elevated structure and at least the majority of said steps are supported below said structure, and spaced apart from each other in a substantially parallel arrangement, and, respectively, a folded position in which said steps are disposed in close proximity to each other, the improvement comprising

support means operable to maintain said ladder rigidly in said operating position and, respectively, to permit said ladder to be folded into said folded position, and including a plurality of rigid links pivotally secured together and to said steps,

wherein each rigid step defines an aperture, said apertures being substantially aligned with each other,

a stacking rod operable to extend through said apertures to maintain said steps in substantially aligned relation to each other in said folded position, said rod including an enlarged portion near one end to restrain the passage of that end through an aperture, and a quick disconnect retaining ring removably insertable over the opposite end of the rod, said ring when inserted being operable to secure said rod within said apertures.

4,231,450

OVERLOAD WARNING SYSTEM

Robert G. Hedtke, Excelsior; Harley A. Harrom, Watertown; Wilfred H. Kelley, Jr., Maple Plain, and Sherman B. Frederick, New Hope, all of Minn., assignors to White Farm Equipment Company, Oak Brook, Ill.

Filed Oct. 23, 1978, Ser. No. 953,424

Int. Cl.³ B66B *9/20*

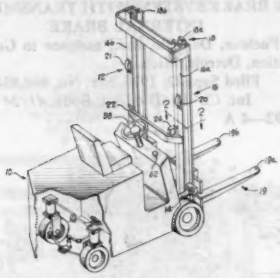
U.S. Cl. 187—9 R **13 Claims**

11. In a vehicle adapted for the transporting and the elevating of loads, the vehicle having a load support and a pair of wheels spaced from the load support, an overload indicator comprising:

(a) a pair of fluid vehicle supports connected to and forming a part of a wheel suspension for said vehicle;

(b) each one of the pair of supports including a movable piston means;

(c) said piston means including a member defining a wheel support for connecting thereto, said wheels;
(d) a conduit means for interconnecting said fluid supports to allow transfer of fluid to level the vehicle when the loads on said wheels are unbalanced;
(e) a pressure responsive means in fluid communication with



said conduit and actuatable by a preset pressure in the fluid conduit corresponding to an overload condition on the load lifting apparatus; and
(f) upon co-actuation of the pressure responsive means and a means to sense a preset elevation of the lifting apparatus, the overload condition on the lifting apparatus is signalled.

4,231,451

BRAKE HOLDER WITH PROTUBERANCES FOR HOLDING A SHOE BODY IN PLACE

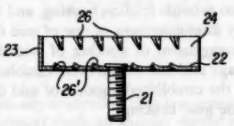
Yuji Fujii, Sakai, Japan, assignor to Shimano Industrial Company, Limited, Osaka, Japan

Filed Aug. 4, 1978, Ser. No. 931,004

Claims priority, application Japan, Aug. 11, 1977, 52-108464[U]

Int. Cl.³ F16D *69/04*

U.S. Cl. 188—73.1 **3 Claims**



1. A brake shoe used in a brake comprising:
a shoe body of a rectangular prism-like shape made of friction material; and
a holder carrying said shoe body and having mounting means for mounting said brake shoe to the brake, said holder comprising a bottom wall, a front wall and a pair of opposite side walls for gripping said brake shoe, said front and side walls being fixed to and rising from said bottom wall, each of said side walls including a first plurality of sharp cutting protuberances directed toward said front wall, said first plurality of protuberances being formed by said side walls being cut at the upwardly outer edge thereof to form cutouts, each cutout forming a protuberance having a free edge directed toward an opposite side wall, said side walls being partially bent inwardly at said cutouts toward said shoe from the bottoms thereof respectively, whereby said free edges of said first plurality of protuberances cut into said shoe body carried by said holder.

4,231,452

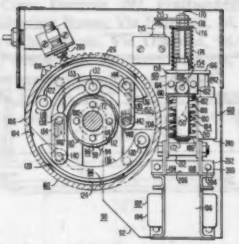
SPRING APPLIED, ELECTRIC RELEASED DRUM BRAKE

Joseph K. Kraft, Parsippany, N.J., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 28, 1978, Ser. No. 973,989

Int. Cl.³ B60T *13/04*

U.S. Cl. 188—171 **8 Claims**



1. A spring-applied, electrically released drum brake, comprising:
a rotatable brake drum,
first and second brake shoes pivotally operable between brake-applied and brake-released positions, relative to said brake drum, with the pivot points of said first and second brake shoes being disposed, relative to the rotational axis of said brake drum, to be self-energizing in one direction of rotation of the brake drum, and partially deenergizing in the other direction,
means for operating said first and second brake shoes including an axially displaceable rod member, and means mechanically linking said rod member and said first and second brake shoes,
first compression spring means on said rod member, said first compression spring means being pre-compressed to bias said rod member in a first axial direction which biases said first and second brake shoes towards the brake-applied position, with a first predetermined force,
electromagnetic means arranged for selective energization and deenergization,
second compression spring means on said rod member,
said electromagnetic means being arranged to compress said second compression spring means when said electromagnetic means is energized, said electromagnetic means compressing said second compression spring means without axial movement of said rod member until the stored force in said second compression spring means exceeds the stored force in said pre-compressed first compression spring means, at which time said rod member is moved in a direction opposite to said first axial direction to operate said first and second brake shoes to the brake-released position,
and control means for controlling the release of the stored force in said second compression spring means when the electromagnetic means is deenergized and said rod member moves in the first axial direction to operate said first and second brake shoes from the brake-released to the brake-applied position,
said first and second compression spring means being arranged relative to said rod member such that movement of said rod member in the first axial direction causes the braking force applied to said brake drum by said first and second brake shoes to be responsive to the difference between the stored forces in said first and second compression spring means at any instant, to cause the braking force applied to said brake drum to start at a low value and increase to substantially the first predetermined force according to the rate at which said control means allows

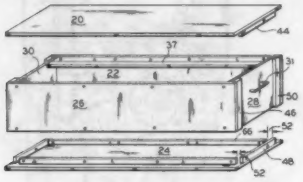
the second compression spring means to release its stored force.

4,231,453

COMBINED BOX, TABLE AND BENCH

William F. Minor, 3614 N. Kilpatrick, Chicago, Ill. 60641

Filed Nov. 20, 1978, Ser. No. 962,374
Int. Cl.[3] A45F *4/00*; A47B *3/10*
U.S. Cl. 190—11 **7 Claims**



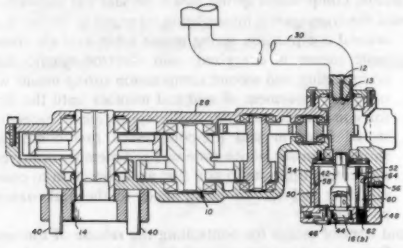
1. A multi-purpose box comprising a plurality of separate panel means having edges formed to nest together when the panel means are assembled in one configuration to form sides and ends of a box and when assembled in another configuration to form a compact luggage-type device, wherein said panel edges comprise stringers running longitudinally along the length of said panels, means for attaching said panels together to secure them in either of said configurations, means for securing together a plurality of said panels in a side-by-side, horizontally-aligned relationship to form a tabletop, and a plurality of separate part means which may be secured together to form at least a means for supporting said tabletop, said separate part means fitting inside space defined by said panels when assembled in either of said configurations.

4,231,454

TORQUE WRENCH WITH CLUTCHES IN SERIES

John H. Bickford, Middletown, and Robert F. Snyder, Hamden, both of Conn., assignors to Raymond Engineering Inc., Middletown, Conn.

Filed Jul. 12, 1978, Ser. No. 923,906
Int. Cl.[3] B60K *41/24*; F16D *67/02*
U.S. Cl. 192—4 R **13 Claims**



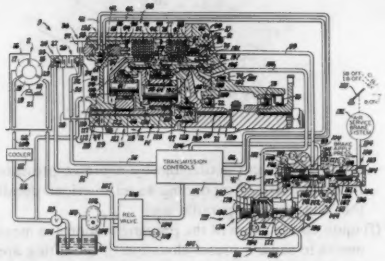
1. A torque wrench including:
a casing;
torque transmission means in said casing;
input means connected to said transmission means for delivering an input force to said transmission means in response to movement of said input means in a first direction;
output means connected to said transmission means for imposing a torque load on an element to be torqued;
one way clutch means coupled to said input means to prevent reaction forces in said wrench from acting on said input means to cause undesired movement of said input means in a direction opposite to said first direction; and
slip brake means connected to said one way clutch means and in series with said one way clutch means, said slip brake means being responsive to a predetermined load on said input means in a direction opposite to said first direction to relax the reaction forces in said wrench.

4,231,455

VEHICLE BRAKE SYSTEM WITH TRANSMISSION AND INTERNAL BRAKE

Reece R. Fuehrer, Danville, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 22, 1978, Ser. No. 944,854
Int. Cl.[2] F16D *67/04*; B60K *41/24*
U.S. Cl. 192—4 A **19 Claims**



1. In a transmission: an input; an output; a multiratio gear unit having gearing having first and second drive establishing means selectively operated for friction engagement to respectively provide first and second ratio drives between said input and said output and simultaneously operated for friction engagement to provide gear braking of said output; friction brake means operatively connected to said output selectively operable to engage and to disengage said friction brake means; drive control means to selectively establish said first and second drive establishing means to respectively provide said first and second ratio drives; and brake control means in brake off position operable to disengage said friction brake means and to permit said drive control means to selectively establish said first and second drive establishing means, and in brake on position operable in all said ratio drives to engage said friction brake means to provide friction braking, and in one ratio drive established by disengagement of one of said drive establishing means and engagement of another of said drive establishing means to engage said one of said drive establishing means to, in concert with the established another of said drive establishing means, provide gear braking.

4,231,456

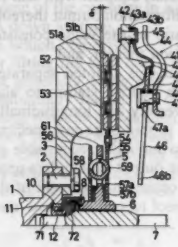
CLUTCH RELEASING DEVICE

Mototaka Nakane, Toyota, and Hideichi Hori, Tokai, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Apr. 20, 1979, Ser. No. 31,734
Claims priority, application Japan, Apr. 28, 1978, 53-51618
Int. Cl.[3] F16D *13/75*
U.S. Cl. 192—70.25 **7 Claims**

1. In a clutch assembly having a driving member, a driven member mounted on said driving member through a bearing means, a disc assembly having a hub drivingly and axially slidable mounted on said driven member,
a clutch releasing device comprising a cylindrical member interposed between said hub of disc assembly and said bearing means,
a resilient means operatively connected to said hub and said cylindrical member for positively urging said disc assem-

bly in one direction wherein said disc assembly is released from said driving member, and



a spring means interposed between said bearing and said resilient means for normally urging said resilient means in said one direction.

4,231,457

THERMOSTATICALLY CONTROLLED FAN CLUTCH

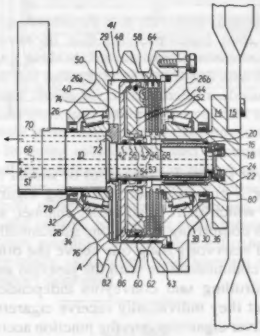
Robert N. Cornish, Huddersfield, England, assignor to Holset Engineering Company Limited, Huddersfield, England

Filed Mar. 6, 1978, Ser. No. 883,567

Claims priority, application United Kingdom, Mar. 7, 1977, 9453/77

Int. Cl.³ F16D *43/25, 25/06, 13/74*

U.S. Cl. 192—82 T **11 Claims**



1. A thermostatically controlled clutch assembly comprising a non-rotatable support shaft, an annular output member journaled for rotation about said support shaft, an annular input member journaled for rotation about said shaft and said output member, one of said members defining an annular chamber, an annular piston housing having an annular groove in one face thereof, said piston housing being positioned within said annular chamber and journaled for rotation about said support shaft and connected for rotation with said input member, an annular piston received in said groove, clutch driving plates connected for rotation with said output member means defining a first passage within the support shaft for conducting pressurized fluid from an external source to the annular piston housing and piston assembly means for defining a second passage within the support shaft for conducting a supply of cooling and lubricating fluid from said external source to the clutch driving and driven plates, and means for commonly draining both the actuating fluid and the cooling and lubricating fluid from the clutch assembly for return to the external source, a control valve and a temperature sending element arranged to open the valve to admit pressurized fluid to said first passage means at and above a predetermined temperature ambient to said sending element whereby to actuate the clutch and establish a driving connection between the input and output members and to close the valve when the temperature ambient to the sensing element is below said predetermined temperature to deactuate the clutch.

4,231,458

CARD COMPRISING AN ELECTRONIC CIRCUIT WITH OBLITERABLE CREDIT ELEMENTS FOR THE DISTRIBUTION OF GOODS OR SERVICES

Mario Limone, Corso Durante, 292, Frattamaggiore (Napoli), Italy 80027; Giovanni Russo, Via Petrarca, 20, Napoli, Italy 80100; Umberto Magliuolo, Via Oberdan, 16/bis, Pozzuoli (Napoli), Italy 80078, and Salvatore Sardella, Via R. Caravaglios, 4, Fuorigrotta (Napoli), Italy 80100

Filed Dec. 13, 1977, Ser. No. 860,229

Claims priority, application Italy, Dec. 14, 1976, 52605 A/76

Int. Cl.² G07F *3/02*

U.S. Cl. 194—4 F **4 Claims**

1. A card for the activation of and payment to a machine in return for services rendered or goods dispensed, said card comprising:

a support base;

card validity check means including a metal element secured to said support base;

an integrated circuit, secured to said support base, including:

fuse means including a plurality of fuse elements which are selectively destroyable in response to passage therethrough of current above a predetermined level, for retaining an electrical representation of a monetary value;

switching means responsive to test signals applied thereto for passing current selectively through individual fuse elements; and

metalized contact areas through which said integrated circuit is able to make contact with said machine.

4,231,459

CONTROL SYSTEM FOR AN N-METHYL-2-PYRROLIDONE REFINING UNIT RECEIVING LIGHT SWEET CHARGE OIL

Avilino Sequeira, Jr., and Frank L. Barger, both of Port Arthur, Tex., assignors to Texaco Inc., White Plains, N.Y.

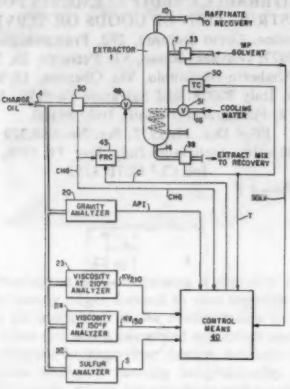
Filed Oct. 19, 1978, Ser. No. 952,898

Int. Cl.³ C10G *21/00*; C06G *7/58*

U.S. Cl. 196—46 **9 Claims**

1. A control system for a refining unit having an extractor receiving light sweet charge oil and N-methyl-2-pyrrolidone solvent and providing raffinate and extract-mix which are subsequently processed to recover the N-methyl-2-pyrrolidone and to yield refined oil and extract oil, respectively, comprising gravity analyzer means for analyzing the light sweet charge oil and providing a signal API corresponding to the API gravity of the light sweet charge oil, sulfur analyzer means for analyzing the light sweet charge oil and providing a signal S corresponding to the sulfur content of the light sweet charge oil, viscosity analyzer means for analyzing the light sweet charge oil and providing signals KV_{150} and KV_{210} corresponding to the kinematic viscosities of the light sweet charge oil corrected to 150° F. and 210° F., respectively, flow

rate sensing means for sensing the flow rates of the light sweet charge oil and the methyl-2-pyrrolidone and providing signals CHG and SOLV corresponding to the sensed flow rates of the light sweet charge oil and the N-methyl-2-pyrrolidone, respectively, temperature sensing means for sensing the temperature of the extract mix and providing a signal T corresponding



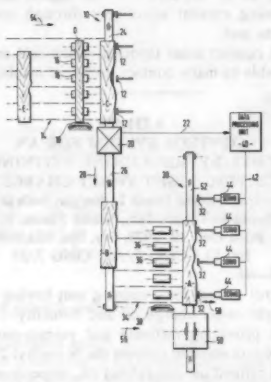
thereto, and control means connected to all the analyzer means, to flow rate sensing means and to the temperature sensing means for controlling one of the flow rates of the light sweet charge oil and the N-methyl-2-pyrrolidone flow rates while maintaining the other flow rate constant in accordance with signals API, S, KV_{150}, CHG, SOLV and T.

4,231,460

SYSTEM FOR TRANSFERRING WANE-EDGED BOARDS

Olli Heikinheimo, Helsinki, Finland, assignor to Plan-Sell Oy, Helsinki, Finland

Filed Oct. 18, 1978, Ser. No. 952,464
Int. Cl.³ B65G *43/08*
U.S. Cl. 198—341 **7 Claims**



1. A system for continuously transferring wane-edged boards through a control station prior to edging to measure the wane edge for a controlled positioning of the board prior to the continuous sequential edging thereof in an edge saw mechanism, comprising:

first conveyor means to continuously align while supplying a plurality of boards sequentially both longitudinally and transversely prior to feeding of the board through the control station to provide an output indicative of the orientation of each board,

data processing means coupled with said control station and responsive to information output thereof to store information characteristic of the wane consistent of the boards and the orientation thereof, and

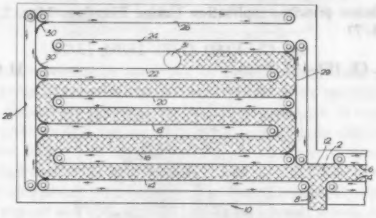
second conveyor means adapted separately to receive the boards from the control station to align the boards in sequence transversely and longitudinally for continously feeding thereof to said edge saw mechanism, said second conveyor means including adjustable positioning means responsive to the output of said data processing means for controlling the optimum alignment of the boards prior to the feeding thereof to said edge saw mechanism.

4,231,461

RESERVOIRS FOR CIGARETTES

Dennis Hinchcliffe; Frank Heybourn, and Eric A. Luddington, all of London, England, assignors to Molins, Ltd., England

Division of Ser. No. 622,709, Oct. 15, 1975, Pat. No. 4,078,648.
This application Mar. 8, 1978, Ser. No. 884,569
Claims priority, application United Kingdom, Oct. 18, 1974, 45316/74
Int. Cl.³ B65G *1/00*
U.S. Cl. 198—347 **11 Claims**



1. A conveyor system for cigarettes or similar rod-like articles, including a conveyor for delivering cigarettes into a junction from which there is an outlet channel, and a pair of reservoirs each comprising at least one substantially horizontal conveyor, said reservoirs lying one above the other with one end thereof in communication with the junction and means for reversibly controlling said conveyors independently of one another, so that they individually receive cigarettes from the junction or deliver cigarettes into the junction according to the state of supply and demand at the junction.

4,231,462

CAPSULE POSITIONING GUIDE AND ASSOCIATED VACUUM MANIFOLD FOR CAPSULE ORIENTING MECHANISMS

Charles E. Ackley, Sr., Oreland, and Charles E. Ackley, Jr., Philadephia, both of Pa., assignors to R. W. Hartnett Company, Philadelphia, Pa.

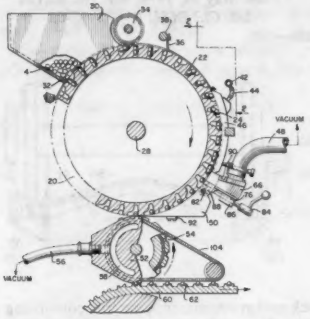
Filed May 15, 1978, Ser. No. 905,742
Int. Cl.² B65G *47/14*
U.S. Cl. 198—380 **10 Claims**

7. In a capsule orienting and turning apparatus wherein said capsules have body portions and cap portions which are of greater transverse dimensions than said body portions, and wherein said apparatus comprises, hopper means into which a multiplicity of said capsules are to be loaded, a continuously moveable capsule transporting conveyor having a plurality of pockets having generally upright pocket portions for receiving the capsules therein, said pockets being substantially equally spaced apart, each said pocket also having a capsule receiving substantially longitudinal pocket portion arranged to carry the capsule with the capsule axis extending in approximately the direction of its movement, and each said pocket having a

substantially crosswise pocket portion arranged to carry the capsule arranged substantially crosswise of the direction of its movement, means for moving said conveyor along a predetermined path with some of the capsules in a caps up attitude and others with a caps down attitude,

the combination which comprises:

tilting means for tilting the caps down capsules into an attitude arranged generally along said predetermined path, means for substantially restraining said caps up capsules from such tilting movement, vacuum rectification means directed to draw transversely of said predetermined path to rectify said capsules by shifting the cap portions of those capsules which are in a caps up position, and also the cap portions of those capsules which have been tilted by



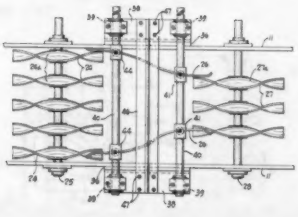
said tilting means, all in a direction generally crosswise with respect to said predetermined path, and capsule positioning guide means interposed between said transport conveyor and said vacuum means and also disposed adjacent to said means for substantially restraining said caps up capsules from said tilting movement for retaining each said capsule in its respective pocket portion immediately prior to its being subjected to said vacuum rectification means and then releasing said capsule when it is subjected to said vacuum rectification means, wherein said vacuum rectification means comprises a vacuum manifold and wherein said capsule positioning guide means is carried by said vacuum manifold, said apparatus further comprising means pivotally connecting said vacuum manifold and said transport conveyor.

4,231,463

BOTTLE STREAM COMBINER AND DIVIDER

Michael Vamvakas, Rocky River, Ohio, assignor to Niagara Bottle Washer Manufacturing Co., Cleveland, Ohio

Filed Jan. 22, 1979, Ser. No. 5,366
Int. Cl.³ B65G *47/68*
U.S. Cl. 198—446 **8 Claims**



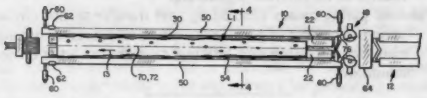
8. The method of arranging and combining bottles standing on end while moving said bottles in a single plane, comprising feeding a miscellaneous collection of said bottles towards conveying means, receiving said bottles and conveying them in a direction along plural parallel paths spaced apart less than the diameter of said bottles, nudging said bottles toward said paths by rotating helical vanes between said paths as the bottles move in said direction said vanes being on an axis that is transverse to said paths of the bottles, then guiding said bottles toward the laterally inward of said parallel paths, and again nudging said bottles onto said laterally inward paths.

4,231,464

CONVEYOR WITH LATERALLY ADJUSTABLE FLIGHTS

Jay C. Neilson, Lakewood, Colo., assignor to Kockum Industries, Inc., Talladega, Ala.

Filed Jan. 15, 1979, Ser. No. 3,213
Int. Cl.³ B65G *17/30, 47/22*
U.S. Cl. 198—456 **17 Claims**



1. A conveyor system comprising:

endless flexible conveyor means movable along a conveyor path;

multiple flight means spaced apart along said path, each said flight means including a base portion and a load-engaging portion, said load-engaging portion being movable relative to said base portion transversely between a centered position in said path and a position laterally offset from said centered position; and

a line bar extending lengthwise along the conveyor path;

the line bar being movable transversely to said path to laterally engage said load-engaging portion to move said load-engaging portion to a selected lateral position;

whereby an object supported on said flight means can be transported on said conveyor means along said path and laterally reoriented with respect to said path.

11. A conveyor system comprising:

endless flexible conveyor means movable along a conveyor path;

multiple flight means spaced apart along said path; and

a stationary bearing surface means along said path;

said flight means including a base portion connected to said conveyor means and a load-engaging portion movable relative to said conveyor means transversely of said path;

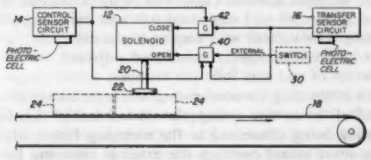
the load-engaging portion including bearing means for supporting the load-engaging portion on said surface means for movement both along and transversely of said conveyor path.

4,231,465

SELF-TIMING AUTOMATIC CONVEYOR SYSTEM

Ronald D. Bourgeois, 38 Ellison Park, Waltham, Mass. 02154

Filed Oct. 26, 1978, Ser. No. 955,140
Int. Cl.³ B65G *43/08, 47/26*
U.S. Cl. 198—460 **7 Claims**



1. A self-timing automatic conveyor system comprising:

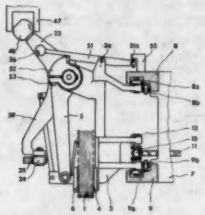
a low-friction conveyor belt;
a holding mechanism actuatable to open and close for selectively controlling flow of goods along said conveyor belt;
a control sensor circuit including a first sensor proximate said conveyor belt and adjacent said holding mechanism for monitoring flow of goods along said conveyor belt up to said holding mechanism;
a transfer sensor circuit including a second sensor spaced downstream from said first sensor and proximate said conveyor belt for monitoring flow of goods along said conveyor belt released by said holding mechanism;
first gating means, enabled by said control sensor circuit upon the presence of goods at the position of said first sensor and by said transfer sensor circuit upon the passing of goods released during the previous cycle of operation by said holding mechanism, for actuation of said holding mechanism to the open condition to pass goods upon receipt of an external signal; and
second gating means enabled by said transfer sensor circuit upon the passing of goods released by said holding mechanism, for actuating said holding mechanism to the closed condition.

4,231,466

BOOK BLOCK TRANSPORT SYSTEM

Horst Rathert, Minden, Fed. Rep. of Germany, assignor to Rahdener Maschinenfabrik August Kolbus, Wesphalia, Fed. Rep. of Germany

Filed May 17, 1978, Ser. No. 906,843
Claims priority, application Fed. Rep. of Germany, Jun. 4, 1977, 2725416
Int. Cl.³ B65G *29/00*
U.S. Cl. 198—479 **4 Claims**



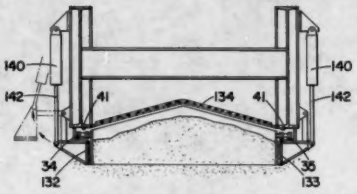
1. In a book block transport system of the type having a plurality of block pincers, the block pincers comprising a supporting frame which is driven along a continuous path, the supporting frame having at least a first stationary internal clamping jaw, and a swinging frame rotatably suspended from the supporting frame, an external clamping jaw being attached to the swinging frame and being rotatable with respect thereto to provide for positioning of a face of the external clamping jaw parallel to a face of the internal clamping jaw, the transport system further including a torsion spring for urging the internal and external clamping jaws together, the improvement comprising:
a two-dimensional cam having a groove therein, said cam being stationary with respect to the supporting frame;
a cam follower member capable of being positioned within the groove of said cam, said follower being capable of vertical movement with respect to the cam;
lever means operatively connected adjacent a first end thereof of said cam follower member;
means connecting a second end of said lever means to a first end of the torsion spring, the second end of the torsion spring being connected to the swinging frame whereby the lever means operates the external clamping jaw between the open and closed positions;
a compression arm integral with said lever means, a first end of said compression arm being connected to the said first end of the torsion spring;
a guide rail arranged on the side of the transport system opposite to the internal clamping jaw; and
means for coupling the second end of said compression arm to said guide rail to cause exertion of the clamping force of the external clamping jaw on a book block positioned between the external and internal clamping jaws.

4,231,467

DRY STACKER AND RECLAIMER

Edward E. Cheek, Brunswick, Ohio, assignor to Dravo Corporation, Pittsburgh, Pa.

Filed May 24, 1979, Ser. No. 42,126
Int. Cl.³ B65G *65/00, 65/02*
U.S. Cl. 198—508 **4 Claims**



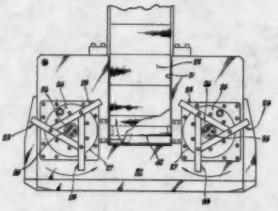
1. A backstacker-reclaimer apparatus comprising a frame, a combined stacking and reclaiming boom having proximal and distal extremities mounted on said frame, means for raising and lowering the distal extremity of the boom, a plurality of spaced stacking and reclaiming flights having end edges, endless means for supporting said flights longitudinally movable along the upper and lower reaches of said boom, including head and tail sprocket means for said endless flight supporting means located at the distal and proximal extremities of said boom, means for removing reclaimed bulk material, means for feeding bulk material to the lower reach of said boom to permit the flights of said lower reach to push said material onto a stack, fencing means extending from at least one side of the lower region of said boom in a direction substantially perpendicular to said flights and extending so as to substantially cover said end edges, said fencing means being retractable to expose the edges of the flights.

4,231,468

COAL-GATHERING ASSEMBLY FOR A CONTINUOUS MINER

Dempsey G. Tucker, 600 E. Oak St., Mascoutah, Ill. 62258

Filed Feb. 21, 1978, Ser. No. 879,353
Int. Cl.³ B65G *65/16*
U.S. Cl. 198—515 **9 Claims**



1. A coal-gathering assembly, comprising:
(a) a rotatively mounted base plate, and
(b) a plurality of bars carried by the base plate, each bar extending across the base plate so that one bar end is

adjacent the next angularly adjacent bar and that the other bar end extends beyond the periphery of the base plate, each bar including a leading edge facing in the direction of base plate rotation and extending substantially between its ends, and a trailing edge facing in the opposite direction and extending outwardly from the leading edge of the next angularly adjacent bar, said leading edge and said trailing edge being continuous for providing a substantially inwardly closed pocket that holds the coal and for pushing the coal laterally outward as the base plate rotates.

4,231,469

CONVEYOR

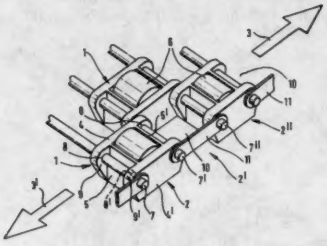
John R. Arscott, Huntingdon, England, assignor to Ling Systems Limited, Bedfordshire, England

Filed Oct. 24, 1978, Ser. No. 954,200

Claims priority, application United Kingdom, Jan. 20, 1978, 2431/78

Int. Cl.³ B65G *17/00*

U.S. Cl. 198—779 **20 Claims**



1. A conveyor comprising:

a plurality of cradles, each of said plurality of cradles further having a substantially "H" shape;

a plurality of rotatable members mounted in spaced relationship to said plurality of rotatable cradles, each of said rotatable members further being mounted on each side of the bridge of the "H" shape of each of said plurality of cradles; and

means for rotatably mounting each of said rotatable members in each of said plurality of cradles such that each of said rotatable members extends above each of said plurality of cradles for rolling contact with an object placed on the conveyor.

4,231,470

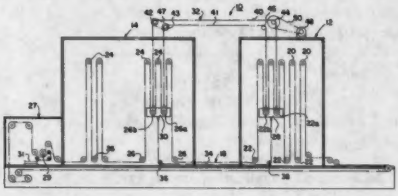
CONVEYOR SYSTEM

Ralph C. Parkes, Rydal, Pa., assignor to National Drying Machinery Company, Philadelphia, Pa.

Filed Nov. 21, 1977, Ser. No. 853,310

Int. Cl.² B65G *21/14*

U.S. Cl. 198—797 **8 Claims**



1. In a conveyor system of the type suitable to transport a plurality of containers through a first environmental area and a second environmental area wherein the conveyor follows a first path about a first plurality of upper sprockets and a first plurality of lower sprockets to define a first conveyor length within the first area and wherein the conveyor follows a second path about a second plurality of upper sprockets and a second plurality of lower sprockets to define a second conveyor length within the second area, the improvement comprising a first conveyor length adjustment means for changing the length of the conveyor in the first area, said first conveyor length adjustment means including first means to move some but not all of said first plurality of lower sprockets, and second length adjustment means including second means to move some but not all of said second plurality of lower sprockets for providing a corresponding, but opposed conveyor length change in the second area, said first conveyor length adjustment means is being associated with the movable ones of said first plurality of lower sprockets for moving them to either increase or decrease the vertical spacing between sprockets in the first area, within preselected limits, and the second conveyor length adjusting means being associated with the movable ones of said second plurality of lower sprockets for moving them to either increase or decrease the vertical spacing between the sprockets in the second area for providing a corresponding, but opposite, increase or decrease in the vertical spacing between sprockets in the second area,

whereby, for a given conveyor speed, the ratio of time of a container within the first area to the time of the container within the seccond area can be varied.

4,231,471

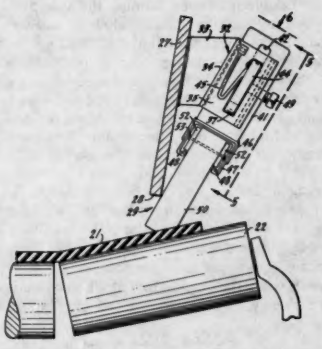
CONVEYOR SKIRTBOARD APRON

James R. Gordon, 301 W. Boling, Benton, Ill. 62812

Filed Apr. 13, 1979, Ser. No. 29,684

Int. Cl.³ B65G *21/20*

U.S. Cl. 198—836 **8 Claims**



1. A skirtboard apron assembly for a belt conveyor for granular material of the kind comprising a rigid skirtboard positioned a short distance above the conveyor belt and a resilient, replaceable apron mounted on and extending downwardly from the skirtboard to close the gap between the skirtboard and the belt, the apron assembly, in assembled condition, comprising:

a plurality of U-shaped brackets mounted at spaced positions along the skirtboard, each bracket having a base and two side walls defining a generally vertically oriented receptacle, the bracket side walls including aligned wedge-receiving apertures;

a corresponding plurality of tension arms, each positioned in one of the bracket receptacles and each including a wedge-receiving aperture aligned with the wedge-receiving apertures in the bracket sidewalls, each tension arm being affixed to a horizontally oriented apron-mounting channel extending parallel to the conveyor belt surface;

a corresponding plurality of wedges, each inserted through the wedge-receiving apertures in one mounting bracket and in one tension arm to mount that tension arm in the bracket;

and an apron having a longitudinally extending mounting element affixed thereto, the mounting element being slidably fitted into the channel of each tension member to suspend the apron from the tension member;

the vertical position of the apron being determined by the extent to which the wedges are inserted into the mounting brackets.

4,231,472

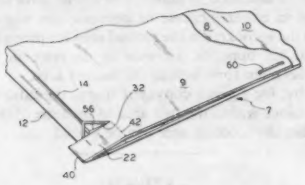
OUTER MAILING JACKET

Joseph Dlugopolski, Lombard, Ill., assignor to Fidelity Container Corporation, Elk Grove Village, Ill.

Filed Nov. 24, 1978, Ser. No. 963,337

Int. Cl.³ B65D *85/30, 85/57*

U.S. Cl. 206—309 **8 Claims**



1. An outer mailing jacket comprising a rectangular blank having a series of three major panels extending across the full width of said rectangle, each major panel being defined by two pairs of double, spaced parallel, fold lines extending transversely across substantially the entire blank, the spaces between the double fold lines defining the side panels of a box made by folding the two outside panels of said series over the center panel of said series, each of said fold lines terminating at their opposite ends in cut lines before said fold lines reach the edge of the rectangular blank, and non-folding offset panel means within said rectangle, each of said cut lines beginning at one of said parallel fold lines and extending beyond the associated parallel fold line, one side of said offset panel being defined by said cut line, and an opposite side of said offset panel being defined by an edge of said blank, one end of said offset panel being defined by a fold line positioned between said spaced parallel fold lines, the other end of said offset panel being defined by a fold line at the end of said cut line which extends beyond said associated parallel fold line, said offset panel means tipping to form an acute angle with respect to other panels when the blank is folded whereby said offset angle forms a barrier to prevent an object from sliding out of said jacket.

4,231,473

DUAL PURPOSE INSERT FOR TAPE CARTRIDGES AND CASSETTES

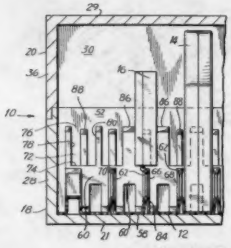
Vaughn Aprahamian, Rego Park, N.Y., assignor to Le-Bo Products Co., Inc., Maspeth, N.Y.

Filed Mar. 20, 1979, Ser. No. 22,145

Int. Cl.³ B65D *85/672*

U.S. Cl. 206—387 **13 Claims**

1. An insert adapted to be received within a carrying case and to itself selectively receive and store a plurality of first and second types of generally rectangular polyhedral objects in at least one arrayed row, said first type of polyhedral object having a relatively large thickness and a relatively small width as compared to said second type of polyhedral object, said insert comprising: at least one longitudinally extending trough, each of said troughs including first and second parallel, vertically extending side walls, each having an upper edge, the distance between confronting surfaces of said first and second side walls being substantially equal to or slightly greater than said width of said first type of polyhedral object and slightly smaller than said width of said second type of polyhedral object; a bottom wall affixed to said first and second side walls; a plurality of storage compartments each adapted to receive and store one of said first type of polyhedral object, said storage compartments including a first longitudinally arrayed plurality of parallel, upstanding partitions projecting inwardly from said first side wall, a second longitudinally arrayed plurality of parallel upstanding partitions projecting inwardly from said second side wall, each of said partitions having a topmost extension, said first plurality of partitions projecting toward and being substantially transversely coplanar with corresponding ones of said second plurality of partitions, the longitudinal spacing between confronting faces of longitudinally adjacent ones of said partitions being substantially equal to or slightly greater than said thickness of said first type of polyhedral object; and a longitudinally arrayed plurality of pairs of shelves, each of said pairs of shelves being adapted to receive and store one of said second type of polyhedral objects, said shelves including a first longitudinally arrayed plurality of shelves recessed within said first side wall with the lowermost part of said shelves being located to be above said topmost



extensions of said first plurality of partitions; a second longitudinally arrayed plurality of shelves recessed within said second side wall with the lowermost part of said shelves being located to be above said topmost extensions of said second plurality of partitions, each one of said second plurality of shelves being transversely aligned with and confronting one of said first plurality of shelves and together forming one of said pairs of shelves, each of said shelves having a bottom surface, an open top, first and second side edges and a rear wall, the distance between said side edges of each of said shelves being substantially equal to said thickness of said second type of polyhedral object, the distance between said respective rear walls of each of said pairs of shelves being substantially equal to or slightly greater than said width of said second type of polyhedral object, the longitudinal distance between corresponding side edges of at least one longitudinally adjacent pair of said shelves being smaller than the median longitudinal distance between corresponding portions of longitudinally adjacent pairs of said partitions, whereby the total number of corresponding pairs of shelves within each of said troughs exceeds the total number of first polyhedral object storage compartments and whereby said insert can receive and store a larger number of polyhedral objects of said second type than of said first type.

4,231,474

STORAGE CASE

Kenji Takahashi, Tagajo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 2, 1979, Ser. No. 26,311

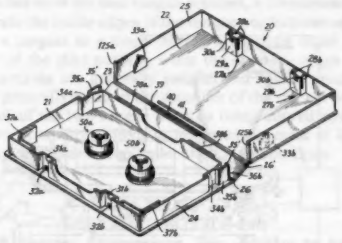
Claims priority, application Japan, Apr. 7, 1978, 53/46334[U]; Apr. 11, 1978, 53/47355[U]

Int. Cl.³ B65D *85/67*

U.S. Cl. 206—387 **17 Claims**

1. A storage case, adapted to store a cassette of the type

having at least one reel, comprising walls closable to form said storage case; and at least one hub engaging member mounted on one of said walls for engaging the hub of said at least one reel when said cassette is placed into said storage case, said hub engaging member including a post extending from said one wall, said post having a longitudinal slit therein parallel to the longitudinal axis thereof to form two post portions which are compressible toward each other in the diametrical direction across said slit, each of said post portions having a finger projecting outward therefrom adjacent a free end portion of the respective post portion and defining an inclined cam surface, a coil spring positioned over and guided by said post, a cap including a cylindrical side wall, a top wall with a central depression and an annular shoulder extending around an opening in said depression, said cap being positioned over said post and said spring such that, in passing said post through said opening in the central depression for assembling said cap to said post, the annular shoulder of said cap acts on said inclined cam surface of each of the fingers and thereby compresses the post portions to permit the fingers to pass through said opening and then to expand in said depression and lockingly engage said annular shoulder, said coil spring exerting a bias force on said cap in the direction urging said annular shoulder against said fingers, means provided on said top wall of the cap to engage said hub, a ring member projecting axially from said one wall concentrically with respect to said post and being in axially overlapping relation with said cylindrical side wall of the cap when the latter has said annular shoulder urged against said fingers, and cooperatively engageable, axially extending



key-way means and rib means on said ring member and side wall, respectively, to prevent rotation of said cap, said cylindrical side wall of the cap having an axial dimension such that its edge is spaced from said one wall when said annular shoulder engages said fingers.

5. A storage case comprising a top wall; a bottom wall; an end wall hingedly connected to each of said top and bottom walls; a peripheral wall extending from one of said top and bottom walls in the upward direction when said storage case is opened; a peripheral skirt extending from the other of said top and bottom walls in the upward direction when said storage case is opened; at least one releasable locking means on said skirt including a substantially rectangular assembly having a first wall formed by said skirt, a pair of opposite side walls, a second wall secured to said side walls, a pair of slits provided in said pair of side walls, respectively, to enable said second wall to flex in response to a force exerted thereon, and a projection extending outwardly from said second wall; at least one recess in said peripheral wall for receiving said rectangular assembly and dimensioned to exert a force sufficient to flex said second wall when said storage case is closed; and an aperture in said recess for receiving said projection extending from said second wall when said storage case is closed so as to releasably lock said storage case in its closed position.

14. A storage case comprising a top wall; a bottom wall; an end wall interconnected between said top and bottom walls; said top, bottom, and end walls being of unitary construction; the junctions formed by the interconnection of said end wall to each of said top and bottom walls being bevelled to facilitate the closing of said case; each of said bevelled junctions having a respective slit completely through a longitudinal portion thereof to form a flexible hinge; and a respective pair of longitudinal ribs running parallel to and on either side of each said respective slit to contact one another under a compressive load when said case is closed and assist said end wall and said top and bottom walls in supporting one another.

15. A storage case comprising a top wall; a bottom wall; an end wall interconnected between said top and bottom walls; said top, bottom and end walls being of unitary construction; the junctions formed by the interconnections of said end wall to each of said top and bottom walls being bevelled to facilitate the closing of said case; and a plurality of longitudinally extending recesses in each bevelled junction, each recess having a deeper portion thereof in the vicinity of its mid-section and gradually shallower portions extending in opposite longitudinal directions from said deeper portion.

17. A storage case comprising a top wall; a bottom wall; an end wall interconnected between said top and bottom walls; said top, bottom, and end walls being of unitary construction; the junctions formed by the interconnection of said end wall to each of said top and bottom walls being bevelled to facilitate the closing of said case; each of said bevelled junctions having a respective slit completely through a longitudinal portion thereof to form a flexible hinge; a respective pair of longitudinal ribs running parallel to and on either side of each said respective slit to reinforce said flexible hinge when said case is closed; a peripheral wall extending upward from said bottom wall when said case is opened; a peripheral skirt extending upward from said top wall when said case is opened; a corner reinforcing wall secured to said peripheral wall in the vicinity of each corner thereof adjacent said end wall; and a support element on each corner reinforcing wall having a cam surface to contact said skirt while said case is being closed so as to guide said skirt to fit about said peripheral wall to exert an outward force on said skirt to prevent the latter from deflecting inwardly of said case and to reinforce said end wall when said case is closed.

4,231,475

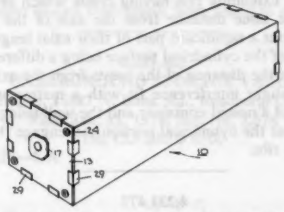
SHIPPING CARTON FOR PILE FABRIC AND A MACHINE FOR WINDING PILE FABRIC ON A REEL

Theodore P. Kessler, Rancocas, N.J., assignor to Timron, Inc., Moorestown, N.J.

Division of Ser. No. 860,963, Dec. 15, 1977, Pat. No. 4,176,803. This application Mar. 20, 1979, Ser. No. 22,293

Int. Cl.³ B65D *85/66*

U.S. Cl. 206—389 **10 Claims**



1. A shipping carton for pile fabric comprising

a reel having a pair of end frames, each said end frame including an endboard of polygonal shape and a plurality of radially disposed hook strips secured to said endboard;

a wrapper disposed peripherally about said reel between said end frames, said wrapper having a plurality of flaps folded inwardly of said wrapper in abutting parallel relation with a respective endboard, each pair of adjacent flaps having a respective one of said hook strips disposed therebetween in abutting relation; and

means securing said wrapper to each said frame of said reel.

4,231,476

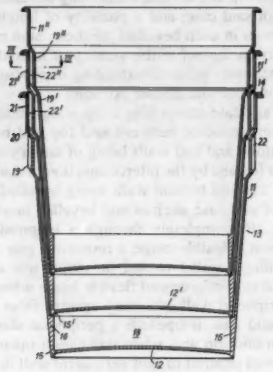
PLASTICS CONTAINERS

Peter A. Compton, and John G. Wood, both of Kings Lynn, England, assignors to Mars Limited, London, England

Continuation of Ser. No. 889,596, Mar. 23, 1978, abandoned, which is a continuation of Ser. No. 812,076, Jul. 1, 1977, abandoned, which is a continuation of Ser. No. 810,827, Jun. 28, 1977, abandoned. This application Jul. 2, 1979, Ser. No. 53,814

Int. Cl.³ B65D *21/02, 77/04*

U.S. Cl. 206—519 **17 Claims**



1. A nestable container at least partially of resilient plastics material comprising:

a bottom wall;

a side wall having an outside and an inside surface and diverging generally upwardly from the bottom wall;

stop and seal surfaces to limit the extent to which identical containers can be nested one inside another and form a sealed space between the bottom walls of nested containers;

holding means for releasably holding identical containers together when nested, the holding means comprising axially extending ribs disposed on one surface of the side wall and a substantially cylindrical surface on the other surface of the side wall, the axially extending ribs being so arranged to engage the substantially cylindrical part of the side wall of an identical container when the containers are nested to hold the containers together by frictional engagement,

the axially extending ribs having crests which are substantially the same distance from the axis of the container throughout a significant part of their axial length, and

the radius of the cylindrical surface being a different dimension than the distance of the crests from the axis so as to form a slight interference fit with a mating cylindrical surface of a nested container and the wall being deformable so that the cylindrical portion can engage the portion with the ribs.

4,231,477

BLISTER PACKAGE FOR MEDICAMENTS SAFE FROM CHILDREN

Wilfried De Felice, Kelkheim, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

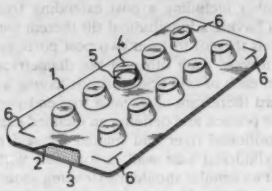
Filed May 17, 1979, Ser. No. 39,896

Claims priority, application Fed. Rep. of Germany, May 20, 1978, 2822100

Int. Cl.³ B65D *83/04, 85/56, 75/70*

U.S. Cl. 206—532 **9 Claims**

1. A blister package for a medicament consisting of a deep drawn plastics film having a sealing edge and being provided with a plurality of recesses for said medicament; a covering film through which said medicament within said recesses cannot be pushed, said covering film being sealed with the plastics



film; said sealing edge being provided with an incision forming a cutting corner in the sealing edge for cutting the covering film.

4,231,478

BULK SORTING OF PARTICULATE MATERIAL

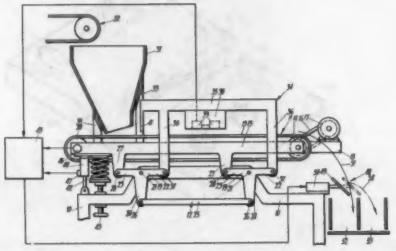
Alan M. Stone, Briar Hill, Australia, assignor to Sphere Investments Limited, Nassau, The Bahamas

Filed Oct. 16, 1978, Ser. No. 951,957

Claims priority, application South Africa, Apr. 26, 1978, 78/2389

Int. Cl.³ B07C *5/00*

U.S. Cl. 209—576 **9 Claims**



1. Apparatus for bulk sorting particulate material into fractions according to the degree to which that material possesses a certain characteristic comprising

means to move said particulate material in a continuous stream along a path, said means including a generally horizontal belt conveyor mounted on movable support means so as to be vertically movable and material feed means which comprises a hopper to receive material to be sorted and which, in operation of the apparatus, feeds material from the hopper onto the belt conveyor at a rate which varies according to the vertical position of the conveyor belt, the vertical position of the conveyor belt being dependent on the weight of feed material in said hopper;

a detector positioned such that material moving in said stream along said path will pass it and responsive to said characteristic so as to produce a time sequence of detector signals dependent on the degree to which material passing the detector possesses said characteristic;

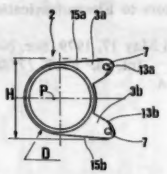
control means to receive said detector signals and to derive therefrom control signals indicative of contiguous zones of the bulk material in the stream possessing said characteristic to differing degrees; and

stream divider means operative in response to said control signals to divide the stream of bulk material into separated material fractions such that material of differing zones is separated into different fractions.

4,231,479
CLOSURE CAPS ADAPTED FOR DISTRIBUTION IN A CHANNEL

Albert Scheidegger, 30 rue Caporal Morange, 69100 Villeurbanne, France

Continuation-in-part of Ser. No. 903,919, May 8, 1978, Pat. No. 4,171,736, which is a division of Ser. No. 862,915, Dec. 21, 1977, Pat. No. 4,114,774. This application Apr. 2, 1979, Ser. No. 26,355
Int. Cl.³ B65D *41/12*
U.S. Cl. 215—250 4 Claims

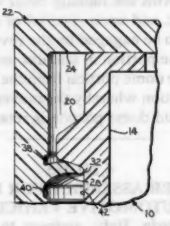


1. A closure cap comprising an annular depending skirt portion having a peripheral rim portion about the bottom thereof, two spaced tongue portions extending rearwardly from and disposed in the plane of the rim portion and forming a V-shaped space therebetween, the inside edges of the two tongue portions forming, with the edge of the rim portion in the space between the two tongue portions, a curvilinear opening wherein the inside edges of the tongue portions are substantially at a tangent to a circle having a diameter equal to the diameter of the skirt portion, while the opposite edges of the tongue portions are generally parallel and spaced apart by a distance generally equal to the diameter of the rim portion, the outer ends of the two tongue portions being curved upwardly along two symmetrical folds to insure engagement of the rim portion of an adjacent cap under the tongue portions.

4,231,480
THREADED BOTTLE LID

George B. Spransy, Oconomowoc, Wis., assignor to Anspack, Inc., Gurnee, Ill.

Filed Jan. 2, 1979, Ser. No. 538
Int. Cl.³ B65D *41/04*
U.S. Cl. 215—329 11 Claims

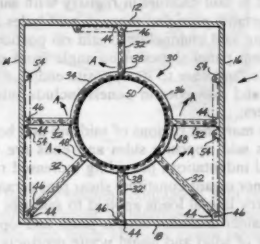


1. A lid for closing the end of a wide mouth container having an exterior helical thread of standard design on the exterior of the mouth, said cap having a sealing disc abuttable with the end of the mouth when said cap is in a closure position, said cap having a skirt depending from the periphery of said disc and lying generally parallel to the exterior of the mouth for surrounding same, said skirt having a helical thread form projecting from the inner wall thereof engagable with the thread on the container mouth for obtaining axial movement between said cap and container responsive to relative rotation therebetween, said thread form having a generally inwardly elongated trapezoidal cross-sectional configuration with a base contiguous with said inner wall, a tip extending inwardly to a predetermined clearance with the container, and a pair of side walls converging in the direction of said tip and lying obliquely with respect to said inner wall, said thread form being tilted in the direction of said disc and formed of a flexible material, said inward extension of said thread form being sufficient to cause said thread form to be deflected away from said disc by engagement with the container mouth thread into wedging contact with the root of the container mouth thread when said lid is threaded on the container.

4,231,481
CONVERTIBLE CONTAINER FOR FLUENT OR SOLID CARGO

Gilbert J. Nash, Edmonds, and Gerhard E. Seidel, Renton, both of Wash., assignors to Boeing Commercial Airplane Company, Seattle, Wash.

Filed Apr. 13, 1979, Ser. No. 29,607
Int. Cl.³ B65D *88/12, 90/04*
U.S. Cl. 220—1.5 12 Claims



1. A cargo container convertible between a solid storage mode and a fluent storage mode comprising

top, bottom and side walls forming a generally rectangular outer container;

an end wall at each end of said outer container substantially closing said outer container;

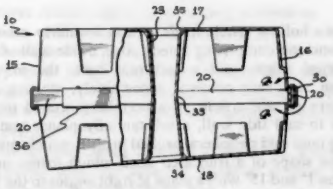
an inner container mounted within said outer container, said inner container comprising at least two curved circumferentially divided shell sections and means to releasably attach said sections to each other to form an open-ended cylinder, said end walls substantially closing said cylinder ends

support means pivotally mounted to said outer container and detachably mounted to said inner containner whereby said support means can be easily detached from said inner container during conversion from fluent to dry mode.

4,231,482
UNDERGROUND STORAGE VAULT

David B. Bogan, 15587 N. Bank Rd., Roseburg, Oreg. 97470

Filed Jan. 11, 1979, Ser. No. 2,574
Int. Cl.³ B65D *6/00*
U.S. Cl. 220—5 A 1 Claim



1. An under ground storage vault comprising:

a box-like storage container having opposite sides, opposite

ends and top and bottom panels carried thereon so as to define a storage compartment between the opposing interior surfaces thereof:

a central column extending along a vertical axis through said storage compartment substantially at center thereof having its opposite ends integrally joined with said top and bottom panels respectively;

a continuous rib carried on the exterior surfaces of said sides and ends midway between said top and bottom panels for conducting lateral loads applied by surrounding earth;

said continuous rib includes an elongated metal channel secured to a central length or portion of said rib associated with each of said sides and ends;

said vertical column is a pair of frustroconical section integrally joined at their adjacent ends and terminating at their opposite ends in a flared junction with said respective top and bottom panels;

removable fastener means joining each of said side and said end channels to its respective rib portion;

said fastener means includes a plurality of metal sleeves molded in place on said rib portion and a plurality of holes carried in said channel in registry with said sleeves;

bolts insertably received through said holes and sleeves for retaining said channel onto said rib portion;

said bottom panel slopes at an angle from one end of said box-like container to its opposite end;

said top and said bottom panels include integrally formed stiffeners;

said edge marginal regions of said top and bottom panels as well as said opposite sides and ends are provided with integral indentations providing increased rigidity;

said fastener means constitute shear pins arranged to support and carry lateral loads applied to said rib;

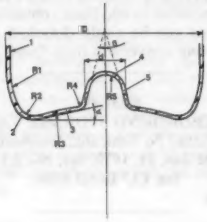
said container includes access ports and openings for the passage of solid and liquid waste products.

4,231,483

HOLLOW ARTICLE MADE OF AN ORIENTED THERMOPLASTIC

Roger Dechenne, Strombeek-Bever, and Guy Hubert, Lasne-Chapelle-Saint-Lambert, both of Belgium, assignors to Solvay & Cie., Brussels, Belgium

Filed Oct. 31, 1978, Ser. No. 956,429
Claims priority, application France, Nov. 10, 1977, 77 34381
Int. Cl.[3] B65D *6/38, 23/00*
U.S. Cl. 220—66 **7 Claims**



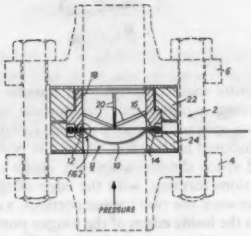
1. In a hollow article made of a molecularly oriented thermoplastic and comprising a neck zone, a side wall of generally cylindrical shape, and a reentrant base, the improvement wherein said base consists, successively, starting from the periphery of said article, of a periphery arched profile connected to said side wall, a substantially planar annular zone joining onto said peripheral arched profile, which annular zone is in the shape of a truncated cone which forms an angle of between 1° and 15° with a plane at right angles to the longitudinal axis of said hollow article, with the inner edge of said annular zone being at a higher level than its outer edge, and a central part in the form of a recessed dome which is connected to said annular zone and the diameter of which is less than 40% of the maximum external diameter of said hollow article, said central part in the form of a recessed dome consisting, successively, of an arched zone which provides the connection with said annular zone, a zone in the shape of a truncated cone, and a central cap pointing towards the interior of said hollow article, and connecting with said truncated cone zone.

4,231,484

SAFETY DEVICE FOR PRESSURE VESSELS

John D. Falconer, Newcastle upon Tyne; George T. Proudlock, Choppington, and Geoffrey Monsen, North Shields, all of England, assignors to Electrofabrication & Engineering Co. Ltd., England

Filed May 17, 1979, Ser. No. 40,039
Int. Cl.[3] F16K *17/40*
U.S. Cl. 220—89 A **10 Claims**



1. A safety device for a pressure vessel, said device comprising a reverse buckling disc including a concave-convex dome portion and an annular or substantially annular flange portion surrounding said dome portion, annular inlet and outlet support means defining an internal passageway for communication with said pressure vessel, the flange portion of the disc being clamped between said inlet and outlet support means with the convex side of the dome portion of the disc freely disposed in said passageway to be subjected to pressure within the vessel, the outlet support means including a substantially flat ring member having an inner, deformable, annular portion, the internal diameter of which is less than the internal diameter of the flange portion of the disc, said deformable portion being located to have a normal rest position in which it overlies, but is out of contact with the radially outer regions of the dome portion of the disc, and upon reversal of the dome portion of the disc, initially to be engaged by the reversing radially outer regions of the dome portion of said disc and thereafter itself to be displaced by the dome portion from the normal rest position to a deformed position whereby the movement of said radially outer regions of said dome portion is retarded.

4,231,485

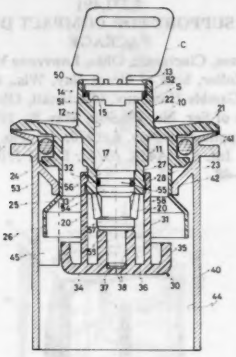
CAP AND FILLER ASSEMBLY FOR FUEL TANKS OF AUTOMOTIVE VEHICLES

Michele Aimar, Turin, Italy, assignor to ITW Fastex Italia S.p.A., Turin, Italy

Filed Sep. 26, 1979, Ser. No. 78,986
Claims priority, application Italy, Sep. 25, 1978, 28020 A/78
Int. Cl.[3] B65D *55/14*
U.S. Cl. 220—210 **4 Claims**

1. A cap and filler assembly for fuel tanks of automotive vehicles, characterized in that the cap comprises substantially a pair of hollow cylindrical members of plastic material, one of which has at one end a control means and a circular flange for the closure of the filler opening and at the other end first snap means for engaging and retaining a cylinder lock and second snap means for receiving a complementary portion of the other of said hollow cylindrical members, said one hollow cylindrical member having also another cylindrical wall intergrally

formed with said flange and terminating with a substantially square cross-section, whereas said other hollow cylindrical member has at one end snap means for engagement with the snap means of said one hollow cylindrical member and at the other end an integral cap portion having the same square cross-section as the square cross-section portion of said hollow



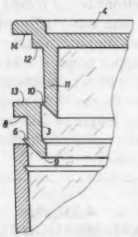
cylindrical member and a seat for receiving the end of said cylinder lock, both of said hollow cylindrical members, when connected by snap action to each other being capable of being rotated with respect to each other by said cylinder lock, and the filler comprises a diaphragm provided with an opening having the same square cross-section as the square cross-section of the portions of the pair of members forming said cap.

4,231,486

CONTAINER SEAL AND CLOSURE

Erik Bock, Kirke Hyllinge, Denmark, assignor to Superfos Emballage, Vipperod, Denmark

Filed Jun. 18, 1979, Ser. No. 49,794
Claims priority, application Denmark, Jun. 23, 1978, 2842/78
Int. Cl.³ B65D *41/32*
U.S. Cl. 220—266 **2 Claims**



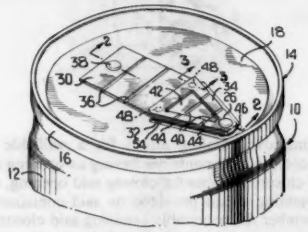
1. A seal for a container which comprises at least one upright wall and a cover, which seal comprises a rim ring engaging the mouth of the container, said cover being formed integral with said rim ring, said cover having an axial flange having a lower edge portion, a rib projecting radially between said lower edge portion and the uppermost end of the rim ring, said rib being tearable and being fractured when the cover and the rim ring are pressed into the mouth of the container, said rib engaging with the lowermost surface of the rim ring when the rim ring and the cover are pressed down into the mouth of the container, said wall of the container having an inner groove, the rim ring comprising a circumferential outer rib which engages with said groove, the rim ring having a supporting edge which turns downwards and abuts the rim of the wall and having a bearing edge which turns upwards and supports an edge portion of the cover.

4,231,487

PULL TAB HAVING MEMORY FOR EFFECTING ROLLING UP OF TAB AND REMOVABLE PANEL PORTION

Gary K. Hasegawa, Chicago, Ill., assignor to The Continental Group, Inc., New York, N.Y.

Filed Aug. 14, 1979, Ser. No. 66,596
Int. Cl.³ B65D *41/32*
U.S. Cl. 220—269 **15 Claims**



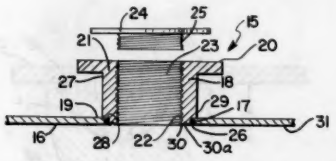
1. A pull tab for easy opening containers, said pull tab comprising an anchoring portion, an intermediate securing portion and a grip portion, and linear memory means extending transversely of said pull tab in said securing portion for effecting automatic folding of said securing portion to a folded out-of-the-way position when released.

4,231,488

CONTAINER CLOSURE SPOUT CONSTRUCTION AND METHOD OF FORMING SAME

William H. Ward, Kinnelon, N.J. 07405, and William H. Ward, Jr., 171A Overmount Ave., West Paterson, N.J. 07424

Filed Apr. 16, 1979, Ser. No. 30,406
Int. Cl.³ B65D *41/04*
U.S. Cl. 220—288 **30 Claims**

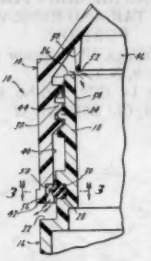


1. Container closure spout construction comprising
a container wall portion having a spout aperture defined therethrough,
a closure spout member having a substantially axially extending tubular portion defining a closure spout opening adapted to receive removably a cooperating closure element thereat,
said spout member being disposed at the spout aperture in engagement with the adjacent marginal portion of the container wall portion thereat, and
a high energy concentration laser beam produced weld seam interconnecting the spout member with the container wall portion along such adjacent marginal portion.

4,231,489
CONTAINER DEPRESSURIZATION SYSTEM

Carl E. Malone, 2281 SW. 33rd Way, Fort Lauderdale, Fla. 33312

Filed Jun. 7, 1979, Ser. No. 46,467
Int. Cl.³ B65D *53/00*
U.S. Cl. 220—304 12 Claims



1. An improved sealing means for a refillable container assembly comprising a container having an opening at one end thereof, a closure member for closing said opening, and cooperating retaining means provided on said container and said closure member for removably retaining said closure member on said container, said improved sealing means comprising:

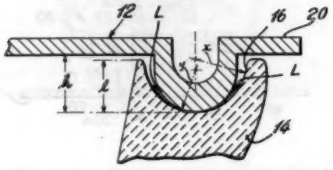
first sealing means provided on an outer sidewall of said container between said retaining means and the end of said container opposite said one end and operative to engage said closure member to form a fluid tight seal between said closure member and said container; and

second sealing means disposed between the interior of said container and said retaining means, said second sealing means engaging and creating a sealing relationship between said closure member and said container so as to prevent nongaseous material within said container from reaching said retaining means.

4,231,490
CONTAINER

Jean-Pierre Boudreault, Mont St. Hilaire, Canada, assignor to Gaylord Regethermic Canada Ltd., Montreal, Canada

Filed Jan. 17, 1977, Ser. No. 760,131
Int. Cl.³ B65D *43/06, 53/06, 25/28*
U.S. Cl. 220—354 5 Claims

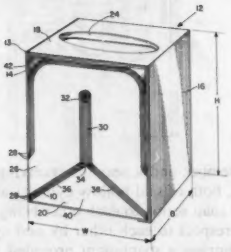


1. A container, including a bowl, the bowl having a rim, a continuous groove defined along the full extent of the rim and opening upwardly, at least the root of the groove being arcuate and having a first radius of curvature, a lid adapted to sit loosely on the bowl, the lid having a continuous rib on one surface thereof resting in the groove, the rib having a height at least greater than the depth of the groove, such that the lid is solely supported by the rib in the groove, at least the crest of the rib being convexly arcuate in cross-section and having a second radius of curvature smaller than the first radius of curvature, so that there is a linear contact between the rib and the groove; such that when the bowl contains a liquid and the lid is seated on the rim, the surface tension of the liquid present in the groove between the rib and the groove at their diverging surfaces will provide a continuous seal on both sides of the linear contact between the rib and the groove so as to enhance the retention of the rib of the lid to the groove on the bowl.

4,231,491
BUNDLE SUPPORT FOR COMPACT DISPENSING PACKAGE

Roger P. Pierson, Cincinnati, Ohio; Lawrence V. Mastalish, and Daniel J. Zollar, both of Green Bay, Wis., assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 798,960, May 20, 1977, abandoned.
This application Nov. 6, 1978, Ser. No. 958,085
Int. Cl.³ A47K *10/42;* B65H *1/00*
U.S. Cl. 221—48 3 Claims



1. An improved compact dispensing package for sheetlike materials comprising:

a folded bundle of sheets of flexible material;

a carton for containing said folded bundle of sheets of flexible material; said carton having a top wall with a dispensing aperture therein; and

a support member for maintaining said folded bundle in dispensing position within said carton; said support member being folded from a blank having first and second stem portions and having a stem projecting toward said top wall; said stem comprising an upper edge and said first and second stem portions being joined at said upper edge and having at least one outwardly projecting protuberance integral with said support member and essentially coincident with said upper edge of said stem; said stem having an outer surface which contacts and supports said folded bundle; said protuberance forming an extension of said stem whereby the length of said outer surface of said stem is greater than the sum of the lengths of said first and second stem portions.

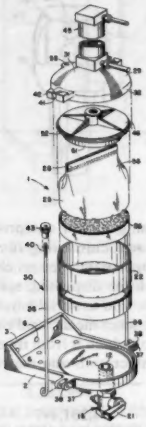
4,231,492
APPARATUS AND METHOD FOR DISPENSING PUTTY-LIKE MATERIAL

Paul W. Rios, Strongsville, Ohio, assignor to Oatey Co., Cleveland, Ohio

Filed Mar. 14, 1978, Ser. No. 886,441
Int. Cl.³ B67D *5/46*
U.S. Cl. 222—1 24 Claims

1. An apparatus for dispensing putty-like material comprising a hollow, open ended dispenser cylinder, a bottom support plate for said cylinder substantially to close off the bottom opening therein, said support plate having an outlet passage, a dispensing valve for opening and closing said outlet passage, said dispensing valve when moved to the open position having a valve passage in vertical coaxial alignment with said outlet passage, a flexible plastic-like bag containing the putty-like material adapted to be lowered into said cylinder, said bag having a bottom of said flexible plastic-like material which

rests on said support plate and covers said outlet passage after lowering of said bag into said cylinder, said dispensing valve when in such open position permitting the insertion of a rod-like device through said outlet passage and said valve passage for puncturing said bottom of said bag to provide an outlet aperture in said bag in vertical alignment with said valve passage and said outlet passage in said support plate, a push plate



in said cylinder including means for contacting the peripheral extent of said cylinder for vertically downwardly directed wiping movement therealong, a top closure plate for said cylinder, and means for urging said push plate downwardly within said cylinder to pressurize the putty-like material within said cylinder, so that when the dispensing valve is moved to the open position, the putty-like material will be dispensed from said apparatus.

4,231,493

LEVER PUMP WITH BUTTON ACTUATOR

Louis F. Kutik, Fort Lauderdale, and Howard E. Cecil, Miramar, both of Fla., assignors to Security Plastics Inc., Miami Lakes, Fla.

Filed Apr. 11, 1979, Ser. No. 28,961
Int. Cl.[3] B05B *11/00*
U.S. Cl. 222—321 **14 Claims**

1. In a manually actuated dispenser pumping system for dispensing product from a container, comprising:

manually actuated pressurizing pump means having a pumping cylinder and a piston which moves in a first direction during an intake stroke and in an opposite second direction during a pressurizing stroke for pressurizing product withdrawn from the container by said pump means;

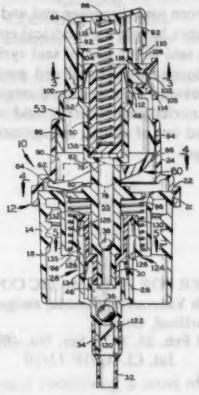
storage compartment means in communication with said pump means for storing pressurized product delivered from said pump means;

accumulator piston means under bias in said storage compartment means and movable by the pressure of the product to expand the capacity of said storage compartment means;

restricted orifice means in communication with said storage compartment means and restricted sufficiently to control the rate of product discharge therethrough so as to cause a portion of the product to be stored in said storage compartment during a pressurizing stroke of said piston of said pump means when pumping continuously to be discharged through said orifice on an intake stroke of said piston, said storage compartment means including an outlet opening in communication with said outlet orifice, said outlet opening being disposed relative to said second spring-loaded piston so that it is opened and closed by movement of the second spring-loaded piston thereby completely controlling the flow to the restricted orifice;

said pump means having an intake valve and an exhaust valve, said intake valve allowing the product to enter said pump means from the container, and said exhaust valve allowing the product to enter said storage compartment means;

the improvement comprising:



lever means for operating said pumping piston of said pump means, said lever means having one pivoted end;

and button means manually movable in said first and second directions to operate the other end of said lever means;

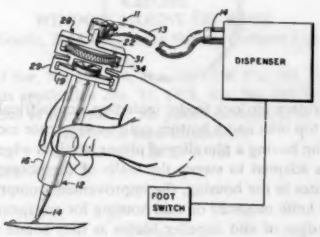
said lever means having an intermediate portion engaging said pumping piston providing a mechanical advantage so that during a given pressurizing stroke of said pumping piston said button means moves farther in said second direction than said pumping piston.

4,231,494

SYRINGE ADAPTOR ASSEMBLY

David L. Greenwood, 3118 Sandy La., Glenview, Ill. 60025

Filed Mar. 22, 1979, Ser. No. 22,698
Int. Cl.[3] B65D *83/14*; B67D *5/54*
U.S. Cl. 222—325 **3 Claims**



1. A connector for attachment of a syringe to a dispenser adapted to provide measured quantities of pressured gas to said syringe to displace the contents of said syringe in measured drops, said syringe having a filling end having at least two oppositely disposed external flanged projections and a dispensing end having a small aperture, said connector comprising a flexible conduit having a dispenser end and a syringe end, means at said dispenser end for attachment of said conduit to said dispenser, an externally threaded tubular member having a flexible conduit end and a syringe end and connected at said

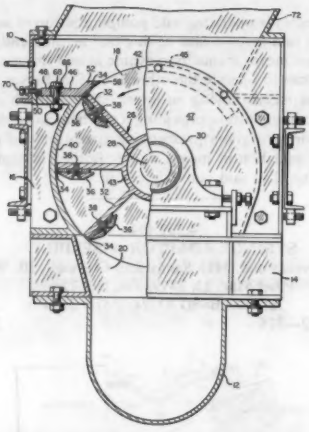
flexible conduit end to said syringe end of said flexible conduit, a syringe retainer member having (1) a collar having centrally disposed apertures loosely fitted about said externally threaded tubular member, (2) oppositely disposed channels for engaging the external flanged projections on said syringe, and (3) a stopper member affixed externally to the syringe end of said externally threaded tubular member, a knurled ring within said collar having an internally threaded aperture threadingly engaged upon said externally threaded tubular member at a portion thereof between said dispenser end and said syringe end, said stopper member having a cylindrical end portion sized to fit loosely within said filling end of said syringe and a sealing flange attached to said cylindrical end portion, said stopper member being movable relative to said retainer member upon rotation of said knurled ring whereby said sealing flange may be moved into and out of sealing engagement with the filling end of said syringe.

4,231,495

ROTARY FEEDER FOR PNEUMATIC CONVEYING LINE

Arvid Lund, North Vancouver, Canada, assignor to Rader Companies, Inc., Portland, Oreg.

Filed Feb. 23, 1978, Ser. No. 880,714
Int. Cl.³ G01F *11/10*
U.S. Cl. 222—345 **4 Claims**



1. In a rotary air-lock feeder including a cylindrical housing having a top inlet and a bottom outlet and a rotor mounted in the housing having a plurality of planar, straight edged impeller blades adapted to sweep the walls of the housing of the rotor rotates in the housing, the improvement comprising:

a shear knife mounted on said housing for engagement with the edges of said impeller blades as they rotate past said inlet,

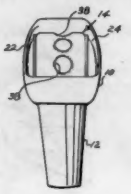
said shear knife comprising a body portion having an arcuate inner surface substantially concentric with said housing axis and a planar top surface lying in a plane defined by two perpendicular intersecting lines one of which lines is horizontal and perpendicular to a vertical plane through said housing axis, the other of said lines being inclined at an angle to the horizontal, said top surface intersecting said inner surface along a sharp edge whereby said sharp edge acts as a shear upon material projecting beyond a rotor blade edge and propelled by a blade upon such sharp edge.

4,231,496

FOOD DISPENSING UTENSIL

Channing W. Gilson, 2046 Hillhurst Ave., Los Angeles, Calif. 90027

Filed Apr. 2, 1979, Ser. No. 26,339
Int. Cl.³ B44D *3/40*
U.S. Cl. 222—414 **34 Claims**



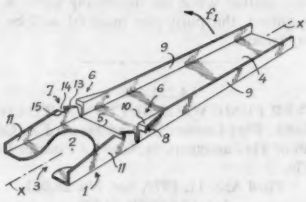
1. A food dispensing utensil comprising: a cup forming a trough; a handle on said cup; a ring rotably supported in said cup, said ring having a cavity to receive a container means containing material to be dispensed, said ring then encircling said container means, said material entering said trough when exiting from said container means, said ring having a peripheral surface at least part of which is from time to time in the trough, thereby to make contact with said material in said trough.

4,231,497

POURING SPOUT WITH PIVOTED NONUSE POSITION

Jean Bourbon, B.P. 1, Saint-Lupicin, France (39170)

Filed Jan. 24, 1979, Ser. No. 6,205
Claims priority, application France, Jan. 25, 1978, 78 02963
Int. Cl.³ B67D *5/06*; B67C *9/00*
U.S. Cl. 222—527 **7 Claims**



1. A pouring spout for various containers of the type having an attachment offering an oblong opening open from one of its edges so as to permit its fitting by sliding and its maintaining in place on the neck of a container, wherein said attachment is extended, on the opposite side to the inlet cross-section of the oblong opening, by a chute connected to the attachment by an articulation zone perpendicular to its longitudinal axis, said chute being provided with catch-type assembly members which co-operate with complimentary members carried by the attachment and which together ensure the maintenance and immobilization of the chute in a direction differing from that of the attachment.

4,231,498

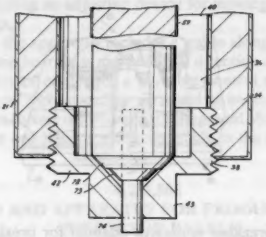
CORROSION-RESISTANT CRUCIBLE WITH GRAPHITE PARTS

James R. Quinan, Loudonville, N.Y., assignor to Albany International Corp., Menands, N.Y.

Filed Nov. 1, 1978, Ser. No. 956,508
Int. Cl.³ B22D *39/00, 41/10*
U.S. Cl. 222—602 **20 Claims**

11. A method of forming a device adapted for metering and transferring liquid metal comprising; the forming of a crucible structure having an open upper end and including a pouring spout having an orifice and a stopper rod shiftable between a

position seating on the pouring spout and sealing the orifice therein and a position removed from the pouring spout to permit liquid metal to flow into and out of the crucible, the space between the open upper end and the stopper rod forming a passage in the crucible structure for the escape of gases from



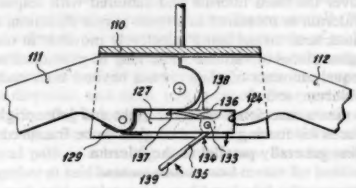
liquid metal contained within the crucible structure, forming at least the portions of the stopper rod and pouring spout which seat to seal the orifice of graphite material, and locating a tip on the stopper rod to extend into the orifice when in the seated position to facilitate isolation of the graphite portions from atmosphere.

4,231,499

HANGER WITH COLLAPSIBLE ARMS PROVIDED WITH A RELEASE AND LOCKING MECHANISM

Peter Smith, Via San Godenzo 16, 00189 Roma, Italy

Filed Mar. 22, 1978, Ser. No. 889,008
Claims priority, application Italy, Aug. 4, 1977, 50565 A/77; Dec. 1, 1977, 52031 A/77
Int. Cl.[2] A47J *51/10*
U.S. Cl. 223—94 **1 Claim**



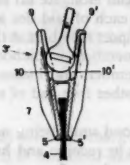
1. A collapsible garment hanger comprising:
a mounting block having a supporting hook;
a pair of arms pivoted to said block for pivotal movement between a first positon wherein said arms are oppositely laterally directed from said block for supporting a garment and a second position extending downwardly from said block to permit a garment to drop therefrom;
interengageable abutments on said arms for limiting relative pivotal movement thereof to said first position;
a spring operated release and locking mechanism extending between said arms for urging said arms to said first position and locking the same in said first position;
manually operable means connected to said mechanism for releasing said arms to drop to said second position;
said mechanism comprising a lever pivoted to one of said arms and having a free end portion bearing on the underside of the other arm, a torsion coil spring urging said free end against said other arm, the free end portion of said lever engaging a shoulder on said other arm when said arms are in said first position to thereby lock said arms, said manually operable means being connected to said lever for swinging the same against the action of said spring;
said free end portion of said lever comprising an upwardly extending projection and said underside of said other arm comprises a cam surface adjacent said shoulder and oblique to the longitudinal axis of said other arm; and
said manually operable means comprising a bell-crank pivoted at its apex within a slot in said lever and having one leg bearing on said one arm and the other leg extending downwardly from said lever.

4,231,500

CLOTHES HANGER

Mario Mainetti, Valdagno, Italy, assignor to S.A. Mainetti, Seclin, France

Filed Feb. 22, 1979, Ser. No. 14,022
Claims priority, application Norway, Apr. 17, 1978, 781330
Int. Cl.[3] A47J *51/142*
U.S. Cl. 223—96 **6 Claims**



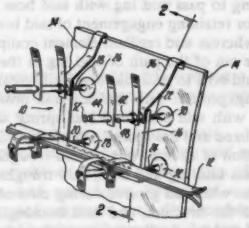
1. A clothes hanger comprising a cross member having a central suspension hook, a pair of clamps carried by the opposite ends of the cross member and each having a pair of opposing substantially rigid claws in articulated relationship with arm extensions of the claws projecting above the points of articulation of the claws, and a pair of cam-shaped rotatable spreading elements one for each clamp lodged between said arm extensions of the clamps to thereby spread the arm extensions apart and draw said claws of the clamps together in gripping engagement on an article of clothing inserted between said claws, and each spreading element comprising an inside hollow portion formed of resilient material positioned perpendicular to the arm extensions of each clamp, an operating arm on said inside hollow portion, and two pegs eccentrically positioned on said inside hollow portion protruding perpendicularly from the plane of said portion and acting simultaneously on the internal surfaces of both arm extensions.

4,231,501

WINDOW MOUNT SKI RACK

David P. Goode, 2015 Long Lake Shores, Orchard Lake, Mich. 48033

Division of Ser. No. 695,314, Jun. 11, 1976, Pat. No. 4,077,554. This application Jan. 13, 1978, Ser. No. 869,110
The portion of the term of this patent subsequent to Mar. 7, 1995, has been disclaimed.
Int. Cl.[3] B60R *9/12*
U.S. Cl. 224—42.46 R **1 Claim**



1. A ski rack arrangement adapted to be mounted on any

substantially vertical window panel of an automotive vehicle comprising:

first and second support units, each including a frame which includes an elongated frame member;

a pair of spaced elongate ski support members carried by and mounted along the length of each said elongated frame member, said elongate ski support member ends extending from one side of the frame to form rests for vertically spaced pairs of skis;

each said frame having mounted thereon at least one suction cup for securement to the window panel; and

at least one hanger of flat stock extending from each said elongated frame member, each said hanger disposed transversely to said elongate ski support members and having a hooked free end for disposition over the top edge of the window disposing each said elongate frame member in a generally vertical direction, to vertically space said elongate ski support members;

a tie for each of said elongate ski support members;

means anchoring each of said ties at one end to one of said elongate ski support members at the point whereat each of said elongate members is anchored into each said elongated frame member, and means for releasably securing said tie to the other free end of said elongate ski support member;

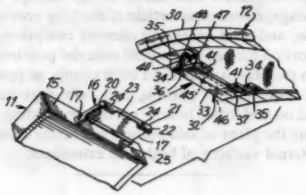
said first and second units being adapted for spaced apart mounting so as to receive and hold skis between the ski support members thereof at two spaced points and secured by said elastic ties.

4,231,502

WATCH BRACELET

Stanley Meyerson, 1111 Ocean Ave., Brooklyn, N.Y.

Filed Aug. 15, 1978, Ser. No. 933,898
Int. Cl.³ A44C 5/14
U.S. Cl. 224—177 **6 Claims**



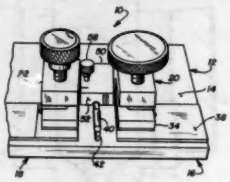
1. A watch bracelet, for connection to a watch casing lug having a retaining boss, said lug having a laterally extending groove located longitudinally inwardly of and defining said boss, and said lug having a land longitudinally inwardly of said groove, comprising a band having an end portion; a hollow housing extending across said band end portion and having one side open for receiving said lug; and a resilient element captive in said housing and normally obstructing the insertion of said lug in said housing, said resilient element being deflectable in said housing to pass said lug with said boss past said resilient element, for retaining engagement of said boss by said resilient element; wherein said resilient element comprises a leaf spring deflectable out of the path of said lug in the direction of, and beyond, said boss to pass said boss and releasable into resilient bearing engagement with said lug and positive retaining engagement with said boss; said leaf spring has a crest remote from said band and has spaced troughs proximate to said band for deflection of at least one of said troughs away from said band to pass said lug and boss, said troughs being in bearing engagement with said groove during connection of the watch casing and the bracelet; and said housing is spaced from a portion of said band adjacent to the land for conforming engagement with said band when said trough of said spring is in said groove.

4,231,503

MICROTOMY KNIFE BREAKER

James K. Butler, 1412 Woodbine Crt., Arlington, Tex. 76012

Filed Mar. 5, 1979, Ser. No. 17,455
Int. Cl.³ C03B 33/02
U.S. Cl. 225—2 **13 Claims**



1. A glass-breaking apparatus adapted for breaking microtome knives of the Ralph type, comprising:

(a) a base having a generally horizontal upper surface, and having right and left portions;

(b) right and left upright structures fixed to the right and left portions of the base, and the upright structures having portions which extend in a cantilevered fashion over the upper surface of the base, and said right and left upright structures having a central gap therebetween;

(c) a rigid fulcrum comprising a hardened and elongated member which is fixed so as to lie between the two upright structures and in a vertical plane being perpendicular to a receiving area for rectangular glass pieces, and the length of the fulcrum being appreciably less than the length of said cantilevered portions of the upright structures, whereby a piece of glass which is wider than said fulcrum may be selectively positioned over said fulcrum and under said cantilevered portions;

(d) structural means having a planar face against which a piece of scored glass can be pushed so as to be positioned over the fixed fulcrum and centered with respect to the fulcrum as measured in a front-to-rear direction, and said structural means being selectively movable in order that glass pieces of variable width may be positioned such that equal amounts of glass extend beyond both ends of the fulcrum; and

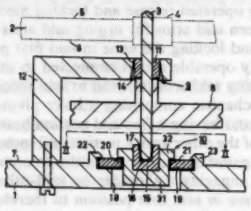
(e) means associated with the right and left upright structures for forcing a piece of glass to be fractured along a line generally parallel to the fulcrum.

4,231,504

ADJUSTING MECHANISM FOR A TAPE RECORDER CAPSTAN

Manfred Ketzer, Vienna, Austria, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 23, 1979, Ser. No. 41,672
Claims priority, application Austria, Jun. 9, 1978, 422478
Int. Cl.³ B65H 17/22
U.S. Cl. 226—180 **5 Claims**



1. A recording and/or playback apparatus for a record carrier in the form of a tape, comprising a drive shaft rotatable

about a longitudinal direction for transport of a tape; two bearings spaced apart from each other in the longitudinal direction of the shaft, in which the shaft is rotatably journalled; and means for mounting the bearings arranged to permit pivoting of the shaft longitudinal direction and for adjusting the angular position of the shaft relative to a reference surface, said means including an adjusting device for moving at least one of the bearings,

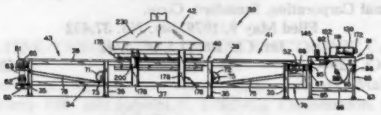
wherein the apparatus includes a guide along which said at least one bearing is movable in a direction of guiding, and said device comprises a movable control slide having at least one sliding surface arranged at an acute angle with respect to said direction of guiding, said slide moving said at least one bearing along the guide as the slide is moved.

4,231,505

METHOD AND APPARATUS FOR PRODUCING SOLAR COLLECTOR PANELS

Anthony R. Shaw, Waterville; Wallace F. Krueger, Toledo, and Lloyd E. Bastian, Perrysburg, all of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Oct. 11, 1978, Ser. No. 950,511
Int. Cl.³ B23K *3/00, 3/06*
U.S. Cl. 228—14 **7 Claims**



1. Apparatus for producing a solar collector panel comprising: a conveyor for supporting a thin metallic, heat conductive sheet in a substantially horizontal plane, said sheet having a plurality of grooves formed therein in a predetermined pattern for receiving a tube assembly formed of conduits arranged in the same predetermined pattern, means for sequentially feeding strips of solder in one direction into said grooves of said sheet before placement of said conduits of said tube assembly therein, means for moving said feeding means transversely of said one direction, said sheet, said strips of solder and said tube assembly forming a loosely assembled unit, means advancing said conveyor for moving said loosely assembled unit in a horizontal path to a heating station, means for clamping said unit together at said heating station, and means for heating said unit to melt said solder strips and bond said tube assembly to said sheet.

4,231,506

METHOD OF WELDING METAL PIPE SECTIONS WITH EXPLOSIVES

Stephen M. Istvanffy, Beaconsfield, Canada, and Vonne D. Linse, Columbus, Ohio, assignors to Canadian Industries Limited, Montreal, Canada

Filed May 21, 1979, Ser. No. 40,515
Int. Cl.³ B23K *20/08*
U.S. Cl. 228—109 **7 Claims**

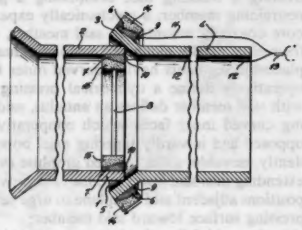
1. A method of welding together a pair of metal tube sections comprising:

(a) Positioning the ends of two metal tube sections together in male/female telescoping relationship, the female tube end being flared outward at an acute angle to the wall of the tube and the male tube end being in contact with an inside circumference of the said female flared tube end,

(b) placing a first continuous substantially band-like charge of a welding explosive against and around the exterior surface of the said female flared tube end,

(c) placing a second continuous substantially band-like charge of welding explosive against and around the interior surface of the male tube end so that the two explosive bands are in a position substantially concentric and adjacent on opposite sides of the telescoped region,

(d) providing initiating means for each of said welding explosive charges, said initiating means comprising a continuous elongated, cord-like charge of high explosives having a velocity of detonation at least 50% greater than the velocity of detonation of said welding explosive charges, the said elongated initiating charges resting in initiating contact with the edge of each charge at a point closest to the narrow diameter of said female flared pipe section, and



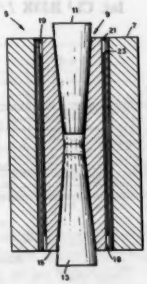
(e) detonating the said welding charges simultaneously by the initiation of each of said cord-like initiation charges at a single initiation point on each cord-like charge, the initiation points being superimposed and opposite one another, the resultant detonation shock front from each of said welding charges moving around the pipe while maintaining a large angle to the tube axis to drive together said female flared section and said male tube end to form a welded connection.

4,231,507

HIGH-TEMPERATURE, HIGH-PRESSURE BONDING OF NESTED TUBULAR METALLIC COMPONENTS

Thomas C. Quinby, Kingston, Tenn., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 9, 1979, Ser. No. 2,140
Int. Cl.³ B23K *20/14*
U.S. Cl. 228—131 **4 Claims**



1. A graphite tool for use in diffusion-bonding a plurality of nested tubular metallic components to form a unitary tubular assembly thereof, said tool comprising:

a tubular restraining member having an axis,

a tubular core coaxially mounted within said member and defining therewith an annulus for reception of said nested components, said core being formed of a plurality of axially elongated segments each displaceable outwardly away from said axis, said segments having confronting curved inner faces cooperatively defining opposed, inwardly tapering, axially extending bores which extend

respectively from the ends of said core to the transverse midplane thereof, and

independently movable, solid, tapered rams respectively extending into said bores and movable inwardly therein to the region of said midplane to be in contact with and exert radially directed force on at least most of the interior surface of said core and compress the received nested components against said member.

3. The method of bonding a metallic foil to a metallic substrate to form a unitary tubular assembly thereof, said method comprising:

providing a bonding tool comprising a graphite tubular restraining member; a mechanically expandable graphite core coaxially mounted in said member, said core being formed of axially elongated and individually radially displaceable segments having curved outer faces which cooperatively define a cylindrical pressing surface which with said member defines an annulus, said segments having curved inner faces which cooperatively define two opposed and inwardly tapering axial bores; and independently movable, solid, tapered graphite rams respectively extending into said bores and movable inwardly therein to positions adjacent said midplane to urge said segments and pressing surface toward said member;

positioning said foil and substrate in nested relation in said annulus, each of the members so positioned being in the form of a tube having a pair of abutting edges;

maintaining the resulting loaded tool in a non-reactive atmosphere and at an elevated temperature promoting bonding of said foil and substrate; and

while the loaded tool is so maintained, maintaining a selected inwardly directed force on each of said rams to exert radially directed force on most of the interior surface of said core and compress said foil and substrate against said restraining member to effect uniform bonding of the confronting faces of said foil and substrate.

4,231,508

METHOD OF MAKING A PLATE-TYPE HEAT EXCHANGER

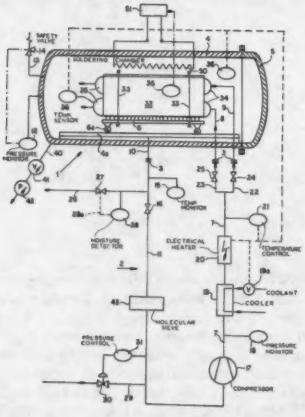
Norbert Wagner, Schlederloh, Fed. Rep. of Germany, assignor to Linde AG, Wiesbaden, Fed. Rep. of Germany

Continuation of Ser. No. 778,460, Mar. 17, 1977, Pat. No. 4,140,266. This application Nov. 24, 1978, Ser. No. 963,289

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1976, 2611832

Int. Cl.³ B23K *1/00*

U.S. Cl. 228—219 **9 Claims**



1. A process for the soldering together of a stack of plates defining spaces between them to form a plate-type heat exchanger from the plates and wherein the spaces are formed as a plurality of passages of said heat exchanger running from one side of the stack to another side thereof generally along the plates, said method comprising the steps of:

holding said plates together in a sealed chamber with solder disposed at junctions between them;

passing a heating gas directly through said passages by distributing said gas thereto and thereby heating said plates, said heating gas being a gas inert with respect to the solder and said plates and being at a temperature below the melting point of said solder the heating gas traversing said passages before entering the chamber space around the held-together plates;

thereafter only discharging the heating gas into the chamber space around the held-together plates;

terminating the flow of gas through said passages;

heating said chamber to a temperature above the melting point of said solder thereby causing said solder to flow and bond said plates together; and

cooling said plates.

4,231,509

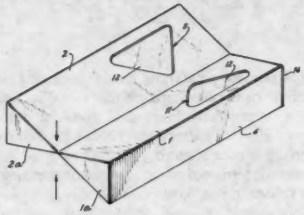
PACKAGE AND BLANK THEREFOR

John J. Austin, Hinsdale, Ill., assignor to Champion International Corporation, Stamford, Conn.

Filed May 9, 1979, Ser. No. 37,432

Int. Cl.³ B65D *5/00, 5/42*

U.S. Cl. 229—22 **4 Claims**



1. A package for a carded blister pack including a generally planar card having two parallel rows of products secured thereto, said package comprising a single sheet folded to define two hollow sections of triangular cross-section which are connected at the apices of the respective triangles, each triangle including an upper wall portion and an identical lower wall portion, and a side wall portion extending from said upper wall portion to said lower wall portion, the upper wall portions of said triangles being inclined downwardly towards one another and towards said lower wall portions, while the latter are inclined upwardly towards one another and towards said upper wall portions, said package further including end walls closing the ends of said hollow sections whereby, with the carded blister pack disposed within the carton, each row of products is respectively disposed within a triangular hollow section.

4,231,510

LIGHT BULB CONTAINER

John M. Beard, Thamesford, Canada, assignor to A & C Boehmer Limited, Kitchener, Canada

Filed Mar. 26, 1979, Ser. No. 23,949

Claims priority, application Canada, Jul. 27, 1978, 308239

Int. Cl.³ B65D *85/42*

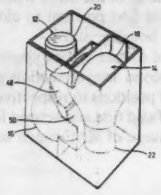
U.S. Cl. 229—39 B **4 Claims**

1. A folding open ended container for a pair of light bulbs, each having a bulb portion and a stem, said container formed from a one piece blank and comprising:

(a) four interconnecting walls to define a rectangular sleeve

having a top, bottom, two opposite sides, and two open ends, and

(b) a partition element having first and second separating portions and first and second bulb retaining portions, the separating and retaining portions each extending across the sleeve between the top and bottom,



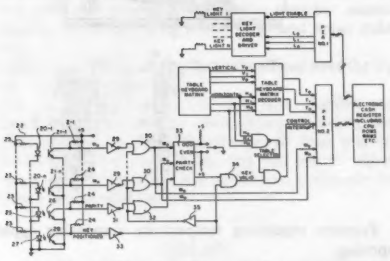
the bulbs being received in the container in end to end relationship with the separating portions of the partition element extending between the bulbs to prevent contact between them and each of the retaining portions of the partition element extending between the bulb portion of one of the bulbs and a respective open end of the container to longitudinally retain said bulb in the container.

4,231,511

WAITER/TABLE CONTROL FOR ELECTRONIC CASH REGISTERS

Matthew J. Campanella, Hammonton; Anthony Maladra, Cherry Hill, and Bennett C. Goldberg, Cinnaminson, all of N.J., assignors to MKD Corporation, Cherry Hill, N.J.

Filed Apr. 17, 1979, Ser. No. 30,760
Int. Cl.³ G06F *15/20*; G06K *15/02, 21/00*
U.S. Cl. 235—375 **15 Claims**



1. In electronic cash registers of the type used in restaurants and the like and providing for data input to the electronic cash register such as waiter identification and table number, the improvements in the mode of waiter/table identification comprising:

a plurality of security devices differing one from another and assigned to and carried by a given waiter; and

first electronic means interconnected to the electronic cash register and operable by each different security device for generating a first electronic signal identifiable with a given security device to provide waiter identification.

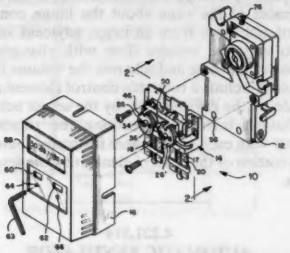
4,231,512

THERMOSTAT

Allan B. Johnson, Mt. Prospect, Ill., assignor to Mark Controls Corporation, Evanston, Ill.

Filed Jun. 26, 1978, Ser. No. 918,969
Int. Cl.³ G05D *23/00*
U.S. Cl. 236—47 **3 Claims**

1. In an improved pneumatic thermostat of the type having two control modes and means to switch from one control mode to the other, said thermostat including two bimetallic elements each regulating the control pressure by exerting force on a pin inside an exhaust nozzle, a control assembly having a bridge extending above and across said bimetallic elements, said bridge having two threaded openings therethrough in locations corresponding to the locations of the bimetallic elements, two dial screws, each threaded into said threaded openings and extending through the bridge to contact the bimetallic elements biased against said dial screw, two tool receivers secured to each of said dial screws, two temperature scales, each secured on one of said dial screws; two set print indicators mounted to said bridge and pointing to said temperature scale;



a cover having windows in locations corresponding to the location of the reading pointed to by each set point on each temperature scale and having two holes in locations corresponding to said tool receivers so that said dial screws can be adjusted by a tool fitting in said tool receivers without removing said cover, the improvement comprising:

a post on said bridge between said dial screws;

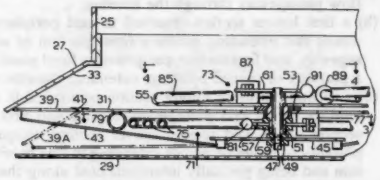
at least one restrictor plate secured to each dial a portion of said plate extending far enough beyond the circumferance of said dial to limit the arc through which each dial can be turned without being stopped by the post.

4,231,513

THERMALLY ACTUATED DIFFUSER

Robert L. Vance, Cupertino, and Robert W. Noll, Santa Rosa, both of Calif., assignors to Acutherm, Inc., Novato, Calif.

Filed Mar. 17, 1978, Ser. No. 887,936
Int. Cl.³ F24F *7/00*
U.S. Cl. 236—49 **4 Claims**



3. A diffuser for circulating conditioned air into a room from a ceiling location within the room and comprising,

an outer can defining an air flow path,

said can having an air discharging outlet,

flow directing means located within the can and having a configuration to cause the air flow to be directed laterally outwardly from the air discharge outlet at a narrow angle with respect to the adjacent ceiling,

volume flow regulating means mounted in the can and movable to vary the volume flow of conditioned air through the diffuser,

a diffuser plate located in the can for receiving circulated room air along the underside of the diffuser plate and having an upperside which causes all the conditioned air to flow through the air discharge outlet,

sensor actuator means mounted on the underside of the

diffuser plate and effective both to sense changes in the room air temperature and to actuate the movable volume flow regulating means directly from power produced by a change in the sensed room air temperature,

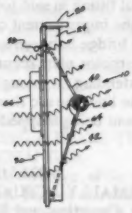
and wherein the volume flow regulating means are operatively associated with the flow directing means to maintain sufficient velocity energy in the air flow through the air discharge outlet that the air flow hugs the ceiling and avoids dumping at all volumes of flow through the diffuser, and wherein the diffuser plate is a rectangular plate, said flow directing means include a vane extending along each edge of the diffuser plate and connected to the diffuser plate by a hinge connection so as to permit swinging movement of the vane about the hinge connection and toward and away from an inner, adjacent surface of the can to vary the volume flow with changes in angular position of the vane and wherein the volume flow regulating means include a rotatable control element mounted for rotation on the diffuser plate by the sensor actuator means and having linkages connecting the rotatable control element with each of the vanes for repositioning the vanes with rotation of the control element by the sensor actuator means.

4,231,514

AUTOMATIC VENTILATOR

Edward D. McSwain, Rte. 7, Box 325, Lincolnton, N.C. 28092

Filed Sep. 10, 1979, Ser. No. 73,892
Int. Cl.³ F24F 7/00
U.S. Cl. 236—49 **11 Claims**



1. An improved wall ventilator for use in building constructions comprising:

(a) a housing having peripheral wall means defining an air flow passageway through the housing;

(b) a first louver section attached to said peripheral wall means and extending across a front portion of said passageway, said first section comprising a fixed panel having a plurality of spaced openings extending therethrough;

(c) a second, movable louver section positioned in and extending across said passageway behind said first louver section panel, said second louver section comprising a plurality of movable panels extending in side by side relation and being pivotally interconnected along their adjacent side edges to move about said edges;

(d) means pivotally connecting the opposite side edge portion of an end one of said second louver section panels to an adjacent side of said first louver section or housing wall means;

(e) means operatively connecting the opposite side edge of the other end one of said second louver section panels to said first louver section panel for sliding movement of said side edge along the rear face of said first louver section panel in response to pivotal movement of said plurality of second louver section panels about their interconnected adjacent side edges;

(f) said second louver section panels being pivotally movable between a first position wherein said panels thereof lie in a common plane parallel to and closely adjacent the plane of said first section panel, and a second position wherein said second louver section panels pivot about their interconnected side edges to lie in planes which are non-parallel to the plane of said first louver section panel;

(g) said second louver section panels having a plurality of openings therethrough alternately spaced therein with respect to said fixed panel openings such that imperforate portions of said first and second louver section panels overlie the openings of the other when said second section panels are in said first position to close the air flow passageway of the housing; and

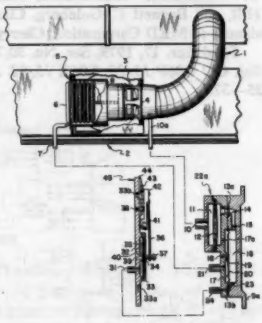
(h) means attached to said second louver section panels for moving said second louver section panels between said first and second positions to respectively close and expose said openings of said first and second louver section panels and control passage of air through said housing air flow passageway.

4,231,515

PRESSURIZED CONTROL SIGNAL APPARATUS

H. Kenneth Ring, Jr., Houston, Minn., assignor to The Trane Company, La Crosse, Wis.

Filed Jun. 4, 1979, Ser. No. 45,527
Int. Cl.³ G05D 23/08
U.S. Cl. 236—87 **8 Claims**



1. Pressure regulating temperature responsive apparatus comprising

a. housing means for defining a chamber;

b. port means extending through said housing means in continuous, unobstructed fluid communication with said chamber, and adapted for connection to a source of air having a variable pressure in excess of atmospheric pressure, for conveying said air into said chamber, and for transmitting a control signal therefrom, said control signal changing pressure in response to temperature;

c. bleed valve means for bleeding air from said chamber;

d. diaphragm means forming a wall of said chamber and operative to control and effect the flow of air out of said bleed valve means in response to an increase in pressure exerted on the diaphragm means by air within said chamber from said source of variable air pressure, thereby causing said control signal not to exceed a maximum pressure in excess of atmospheric pressure, said maximum pressure being determined by the summation of forces acting on the diaphragm means; and

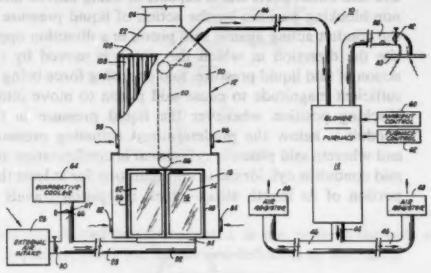
e. temperature responsive means adjacent said diaphragm means for directly exerting a force thereon, thereby biasing said diaphragm means to limit the pressure within said chamber to said maximum pressure in response to temperature.

4,231,516

HEAT CONTROL SYSTEMS

Charles E. Weingartner, Rte. 6, Box 413, Shawnee, Okla. 74801

Filed Feb. 24, 1978, Ser. No. 880,970
Int. Cl.³ F24B 7/02
U.S. Cl. 237—51 11 Claims



1. An auxiliary fuel burning temperature control apparatus for use in a building enclosure in combination with a central furnace and blower system, comprising:

first chamber means having a front opening and defining a fireplace with a continuous volume of chamber around the rear and both sides, said chamber having air intake vents proximate the bottom of each side and an air exhaust vent proximate the top of the rear;

means for enclosing said first chamber means front opening to close said fireplace;

second chamber means of generally cubical form for secure affixure on top of said first chamber means, said second chamber means including a plurality of rows of flue pipes extending vertically therethrough and into communication with said fireplace, said second chamber means including lower lateral air intake vents and upper exhaust vent;

manifold and chimney means securely affixed over the top of said second chamber means;

means for introducing air into said first chamber means fireplace from external to said building enclosure; and

duct means for conveying conditioned air from said upper exhaust vents of each of the first and second chamber means to said central furnace and blower system for distribution within said building enclosure.

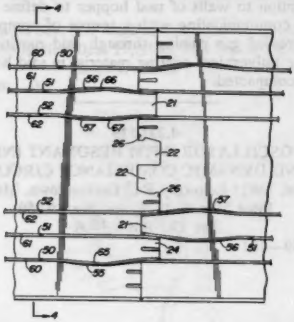
4,231,517

TRACK SECTION FOR MODEL VEHICLES

Richard C. M. Cheng, Suite 1604, Austin Center, Austin Ave., Kowloon, Hong Kong

Continuation-in-part of Ser. No. 717,581, Aug. 25, 1976, Pat. No. 4,084,746. This application Dec. 5, 1977, Ser. No. 857,503
The portion of the term of this patent subsequent to Apr. 18, 1995, has been disclaimed.
Int. Cl.² A63H 18/02, 18/12
U.S. Cl. 238—10 F 2 Claims

1. A track section for model vehicles, said track section comprising a generally flat bed having an upper working surface bounded within a pair of spaced side edges, a plurality of spaced projections on each end edge, said projections combining to define recesses in the spaces between said projections, said projections and recesses being configured for interdigitation upon end to end aligned engagement with a like track section, said working surface being formed with upwardly facing slots having their opposite ends opening into said recesses adjacent to said projections, conductive strips located in said slots and having end portions extending through the open slot ends into said recesses along the adjacent sides of said projections for wiping engagement of said strip end portions with the strip end portions of a like track section on said end to end aligned engagement, and an upstanding wall on each side edge of said bed and having its lower edge spaced above the underside of said bed to define a recess between the lower edge of each upstanding wall and the adjacent side edge of said bed, each of said recesses having a cross-sectional configuration substantially identical to the cross-sectional configuration of a respective upstanding wall above said working surface, for nesting superposed engagement with a like track section with



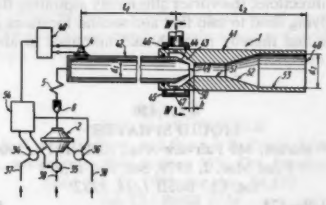
the upstanding walls of the lower section conformably entering said recesses of the upper section for maximum economy of space in storage, said conductive strips being resilient and substantially straight in undeflected condition, and said slots being of a nonstraight configuration to receive said strips in a resiliently deflected condition without permanent strip deformation, said resilient strip deflection serving to frictionally retain said strips in said slots.

4,231,518

APPARATUS FOR EXPLOSIVE APPLICATION OF COATINGS

Anatoly I. Zverev, ulitsa Bratislavskaya, 26, kv. 22, Kiev, and Alexandr S. Bondarenko, ulitsa Nizhegorodskaya, 26, kv. 40, Moscow, both of U.S.S.R.

Division of Ser. No. 788,925, Apr. 19, 1977. This application Mar. 26, 1979, Ser. No. 23,895
Int. Cl.² B05B 1/24
U.S. Cl. 239—81 5 Claims



1. An apparatus for the explosive application of coatings comprising: a composite lengthwise explosion chamber having telescopically interconnected terminal and inner parts, said terminal part being arranged outside and partially enclosing said inner part, said inner part accommodating at least one spark plug and terminating in a jet nozzle, an inner space being defined between said terminal and inner parts, and the zone of interconnection of said terminal and inner parts of said explosion chamber being surrounded by an annular casing which defines, with said terminal part, a space communicating with said inner space; a batcher for metering pulverulent coating material; a preparation chamber for preparation of an explosive mixture communicating with said explosion chamber; a mixing chamber of said batcher communicating with said explosion chamber; a jet nozzle mounted in said mixing chamber for

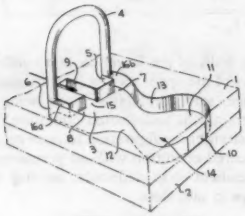
positively feeding the pulverulent coating material to said explosion chamber; a hopper communicating with said mixing chamber via a passage; a device mounted in said passage for controlling the cross-section area of said passage; a non-return valve mounted in a portion of said passage connected to said hopper to close the passage upon back impact of an explosion wave from said explosion chamber; and a partition wall of a gas-permeable material mounted within said hopper in equally spaced relation to walls of said hopper to define an annular space and communicating with a source of compressed gas, said compressed gas passing through said partition wall to prevent the pulverulent coating material in said hopper from being self-compacted.

4,231,519

FLUIDIC OSCILLATOR WITH RESONANT INERTANCE AND DYNAMIC COMPLIANCE CIRCUIT

Peter Bauer, 13921 Esworthy Rd., Germantown, Md. 20767

Filed Mar. 9, 1979, Ser. No. 19,250
Int. Cl.³ B05B *1/08*
U.S. Cl. 239—102 **24 Claims**



1. A fluidic oscillator having a chamber, an inlet opening for issuing a jet of working fluid into said chamber, and an outlet opening for issuing working fluid from said chamber into the ambient environment, characterized by a fluid inertance flow conduit transferring working fluid between first and second locations on opposite sides of said jet and near said inlet opening in said chamber, and a dynamic compliance in the form of a vortex region defined between sidewalls of said chamber which generally converge towards said outlet opening and near said outlet opening such that working fluid in the jet forms in said vortex region a vortex which alternately flows in opposite directions, the vortex alternately aspirating fluid from and supplying fluid to said first and second locations in opposite phase and thereby through said inertance in alternately opposite directions.

4,231,520

LIQUID SPRAYER

John E. Waldrum, 349 Fairview Ave., Ambler, Pa. 19002

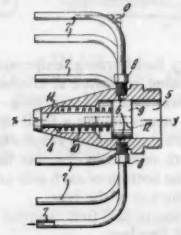
Filed Mar. 2, 1979, Ser. No. 17,078
Int. Cl.³ B05B *1/14, 1/32*
U.S. Cl. 239—171 **6 Claims**

1. A spray device for use on a moving vehicle comprising:

(A) a central body having a conduit defined in said body, said conduit forming a liquid inlet port at one end of the central body, and a plurality of liquid outlet ports located about the periphery of said conduit;

(B) a plurality of discharge tubes extending outwardly from said central body, each of said discharge tubes having one end connected to one of said outlet ports and the other end projecting in a direction opposite the direction of movement of the vehicle during use; and

(C) moveable, pressure-actuated outlet-blocking means positioned in said conduit, said outlet-blocking means being positioned to interrupt communication between said conduit and said outlet ports when the liquid pressure in the conduit is below a predetermined actuating pressure and being positioned to allow communication between said conduit and said outlet ports when the liquid pressure in the conduit is above a predetermined actuating pressure, wherein said outlet-blocking means comprises: a piston which is moveable in said conduit, said piston being positioned in said conduit such that it is normally in a position in which it blocks communication between said conduit and said outlet ports and is capable of being moved into a non-blocking position by the action of liquid pressure in the conduit acting against said piston in a direction opposite the direction in which the piston is moved by the action of said liquid pressure, said opposing force being of sufficient magnitude to cause said piston to move into a blocking position whenever the liquid pressure in the conduit is below the predetermined actuating pressure, and wherein said piston is cylindrical in configuration and said conduit is cylindrical in configuration for at least that portion of its length along which the piston travels in



moving from the outlet-blocking position to the non-blocking position and wherein the end section of each discharge tube nearest the outlet port extends along a line which is radial from the cylindrical axis of said conduit and the middle section of the discharge tube is curved so that the other end section projects along a line essentially parallel to said cylindrical axis in a direction opposite the direction in which the vehicle moves during use, and wherein said piston is hollowed out along a portion of its axial length to form an annular section, said piston being made of a polymeric material which is capable of undergoing cold flow under pressure, and wherein said device further comprises a diametrically expandable spring securely positioned inside the annular section of said piston, the bias of said spring exerting an outward force on the annulus walls, causing a liquid seal to be maintained between the piston and the conduit wall after the piston has undergone wear.

4,231,521

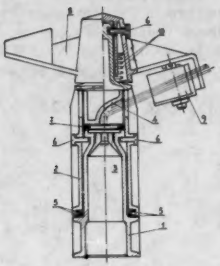
WATER SPRINKLER

Mair Hermine, Bolzano, Italy, assignor to Ipierre Sirotex, S.p.A, Italy

Filed Mar. 5, 1979, Ser. No. 17,454
Claims priority, application Italy, Mar. 23, 1978, 4819 A/78
Int. Cl.³ B05B *3/14*
U.S. Cl. 239—230 **9 Claims**

1. A water sprinkler comprising a sleeve portion fixedly mountable on a water supply pipe, a rotatable member rotatably mounted on the sleeve, nozzle means fixedly mounted in the upper portion of the sleeve so as to be coaxial therewith, and a baffle located within the rotatable member, the baffle

being coaxial with the sleeve, the rotatable member having pivotally mounted thereon at least one swing arm carrying at least one shaped member adapted, in use, to lie in the path of water issued from the nozzle and deflected by the baffle.



4,231,522

STEP-BY-STEP IRRIGATOR

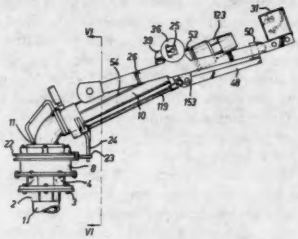
Arno Drechsel, Via Weggenstein No. 29, Bolzano, Italy

Filed Feb. 8, 1979, Ser. No. 10,404

Claims priority, application Italy, Feb. 9, 1978, 46814 A/78; Sep. 14, 1978, 46889 A/78

Int. Cl.³ B05B *3/08*

U.S. Cl. 239—233 **12 Claims**



1. In a step-by-step irrigator, of the type comprising a column, a propelling tube rotatable relative to said column, a torsional brake between said column and said tube, said propelling tube including a laterally extending portion for directing a jet of water along an outward path relative to said column, an impulse arm assembly having a nose, deflector means on said nose, means mounting said impulse arm assembly on said propelling tube for periodic swinging movement between a first position in which a stop on said arm engages a stop on said tube and said deflector means at the nose is in the path of the water jet, and a second position in which the deflector means is spaced from the water jet path, said deflector means being of the type in which the rotational thrust exerted on the tube increases with increased water pressure, and return means for returning the arm toward said first position, a rapid return deflector disposed at the end of a lever lying below the laterally extending portion of the propelling tube, which rises into and lowers below the jet under the action of a mechanism for reversing the rotational direction of motion of the tube, the improvements comprising, in combination, means for automatically adjusting the braking of the rotation of the rotatable tube to increase the braking in response to increased pressure of the water at the propelling tube, and means for adjusting the period of swing of the swinging mobile nose, said deflector means comprising double acting deflector means for swinging the arm in response to impingement thereon by the water jet to move said arm toward said second position, and to arrest said swing during the return movement toward said first position when the stop on said arm is close to colliding with the stop on said propelling tube.

4,231,523

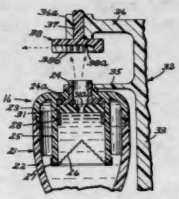
IRRIGATION SYSTEM AND VOLUME CONTROL VALVE THEREFOR

Merle A. Vikre, 32 Windward Way, New Port Richey, Fla. 33552

Continuation of Ser. No. 765,266, Feb. 3, 1977, abandoned. This application Dec. 19, 1978, Ser. No. 971,038

Int. Cl.² B05B *1/32*

U.S. Cl. 239—454 **32 Claims**



1. A device for distributing a constant volume spray of water comprising:

(a) an enclosed housing defining an internal chamber, a fluid inlet adapted for connection to a source of water for receiving water into the chamber, and an outlet constructed and arranged to issue a jet of water therefrom, the transverse dimension of the internal chamber being large in comparison with the transverse dimension of the inlet and outlet;

(b) spray deflector means disposed relative to the outlet for intercepting the jet of water and deflecting it into a spray pattern of predetermined shape;

(c) volume control means associated with the housing outlet for providing an essentially constant output volume of water from the housing outlet; and

(d) a wall member projecting internally into the chamber from the housing outlet in encircling relation thereto and in general alignment therewith, the wall chamber defining an open free end through which water is received from the inlet, said wall member at its free end having an internal transverse dimension larger than the transverse dimension of said inlet and outlet, and said wall member being spaced from the internal wall of the housing to define a dead ended annular space therewith in which air may be caught to act as a shock absorbing cushion to incoming water.

4,231,524

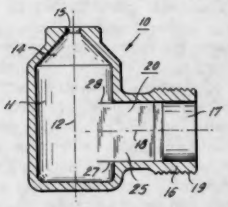
LARGE FLOW NOZZLE

George F. Aprea, Dedham, and Werner P. Pohle, Lynn, both of Mass., assignors to Wm. Steinen Mfg. Co., Parsippany, N.J.

Filed Jul. 12, 1979, Ser. No. 56,870

Int. Cl.³ B05B *1/34*

U.S. Cl. 239—468 **13 Claims**



1. A nozzle for producing a spray directed along an outlet axis, said nozzle including a conical outlet section having a

discharge orifice at its downstream end and being centered about said outlet axis, a cylindrical whirl chamber disposed at the upstream end of said outlet section and centered about said outlet axis, an inlet section disposed upstream of said chamber and having an inlet orifice centered about an inlet axis perpendicular to said outlet axis, a transition passage disposed between said inlet orifice and said chamber, in cross-section transverse to direction of liquid flow therethrough said passage including a straight main section and a remainder including a downward tapering section extending from said main section, said main section being disposed on a flat surface of said passage, said flat surface and said main section being parallel to said outlet axis, said flat surface being essentially tangent to the inner surface of the wall defining said chamber.

4,231,525

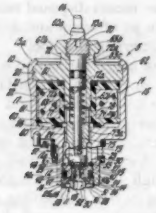
ELECTROMAGNETIC FUEL INJECTOR WITH SELECTIVELY HARDENED ARMATURE

James D. Palma, Grand Rapids, Mich., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 941,754, Sep. 13, 1978, which is a continuation-in-part of Ser. No. 838,468, Oct. 3, 1977, abandoned. This application May 10, 1979, Ser. No. 38,009

Int. Cl.³ B05B *1/32*; F16K *31/02*

U.S. Cl. 239—585 **2 Claims**



1. In an electromagnetic fuel injector of the type having a hollow tubular body with a stepped bore therethrough providing a fuel chamber therein intermediate its ends adapted to receive fuel, a fuel injector nozzle positioned in the stepped bore at one end of the body to define a spray tip at one end and an annular valve seat encircling a discharge passage upstream of the spray tip in communication with the fuel chamber, a valve positioned in the stepped bore for movement into and out of engagement with the valve seat, the valve being flat on one side thereof and being spherical opposite the flat to form a spherical seating surface for valve closing engagement with the valve seat, and a solenoid means including a stationary pole piece and a movable cylindrical armature for actuating the valve for controlling flow from the fuel chamber to the discharge passage; the improvement comprising a non-magnetic guide pin fixed to the pole piece to extend axially toward the valve seat substantially concentric therewith, the armature having a central axial guide bore therein of a diameter to slidably receive said guide pin whereby said armature is axially guided by said guide pin, and wherein at least the internal wall material of said armature defining said guide bore is wear resistant whereby frictional wear between said guide pin and said armature will be substantially reduced during extended operation of the electromagnetic fuel injector, at least the remainder of said armature in the magnetic circuit of the solenoid being of magnetically soft material.

4,231,526

PROCESS AND APPARATUS FOR TREATING WASTE PAPER

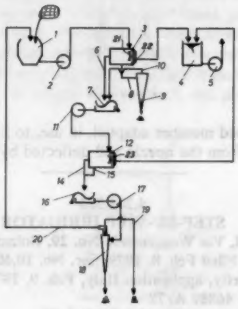
Herbert Ortner; Theodor Bahr, and Walter Musselmann, all of Heidenheim, Fed. Rep. of Germany, assignors to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Filed Dec. 29, 1978, Ser. No. 974,333

Claims priority, application Fed. Rep. of Germany, Dec. 30, 1977, 2759113

Int. Cl.³ B02C *23/38, 23/10, 23/14*

U.S. Cl. 241—28 **10 Claims**



1. A process for treating waste paper comprising:

rough pulping the waste paper in a beater,

treating the rough pulped waste paper from the beater in a lightweight material pulper wherein unpulped lumps of fibers and half-stuff containing foreign matter are separated from half-stuff substantially free of foreign matter,

conveying away the half-stuff nearly free of foreign matter,

treating one portion of the unpulped lumps of fibers and half-stuff containing foreign matter in a hydro-cyclone wherein foreign matter is separated from half-stuff containing some foreign matter,

treating the remaining portion of the unpulped lumps of fibers and half-stuff containing foreign matter from the lightweight material pulper together with the half-stuff containing some foreign matter from the hydro-cyclone in a vibratory sorter to separate the still further foreign matter from half-stuff containing some foreign matter,

treating the half-stuff containing some foreign matter from the vibratory sorter in a further multi-stage sorting and speck removing apparatus wherein additional foreign matter is separated from half-stuff, and

the last-mentioned half-stuff is returned to be again treated in the lightweight material pulper,

wherein the lightweight material pulper separates half-stuff containing heavy foreign matter from half-stuff containing lightweight foreign matter, the half-stuff containing heavy foreign matter being conveyed directly to the hydro-cyclone, and the half-stuff containing lightweight foreign matter being conveyed directly to the vibratory sorter.

6. A waste paper treatment plant comprising:

beater means for rough pulping waste paper,

first pulping and sorter means connected to the beater means for treating rough pulped waste paper to separate unpulped lumps of fibers and half-stuff containing foreign matter from half-stuff nearly free of foreign matter,

hydro-cyclone means connected to said first pulping and sorter means for receiving one portion of the separated out fibers and half-stuff containing heavy foreign matter, said hydro-cyclone means separating foreign matter from half-stuff containing some foreign matter,

vibratory sorter means separately connected to said first pulping and sorter means for receiving the other portion of the separated out fibers and half-stuff containing lightweight foreign matter therefrom, said vibratory sorter

means being connected to said hydro-cyclone means to receive the half-stuff containing some foreign matter therefrom, said vibratory sorter means treating material received thereby to separate the foreign matter from half-stuff still containing some foreign matter, and

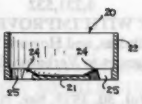
multi-stage sorting and speck removing means connected to said vibratory sorter means to receive therefrom the half-stuff containing some foreign matter for separating out half-stuff nearly free of foreign matter and returning at least some of said last mentioned half-stuff to a point in the plant upstream of said first pulping and sorter means.

4,231,527

CATCHER DEVICE FOR CONDIMENT MILL

William E. Bounds, 23790 Hawthorne Blvd., Torrance, Calif. 90505

Filed Apr. 19, 1979, Ser. No. 31,615
Int. Cl.³ A47J *42/40*
U.S. Cl. 241—169.1 **2 Claims**



1. In a condiment mill having a cylindrical container member for containing the condiment and a grinder mechanism supported in said container member towards the bottom end thereof, there being an opening in said container member opposite the grinder for use in dispensing the condiment from said bottom end, and a catcher device attached to the bottom end of said container member and positioned in said opening opposite said grinder comprising

a cylindrical frame member attached to said container member, said frame member being force-fitted over the bottommost portions of the outer walls of said container member,

a plate member having a concave dish-shaped surface, and

means for suspending said plate member with the dish-shaped surface thereof directly facing the grinder mechanism, there being a large opening formed between the frame member and the plate member to permit the passage of condiment from said grinder mechanism therethrough, said suspending means comprising a plurality of web members extending between the plate and frame members,

whereby surplus condiment falling from the grinder mechanism is caught in the dish-shaped portion of the plate member.

4,231,528

GRINDING MILL SHELL LINER ELEMENTS

Bernard J. Schaeffer, Rifle, Colo., assignor to Amax Inc., Greenwich, Conn.

Filed Jun. 22, 1979, Ser. No. 51,083
Int. Cl.³ B02C *17/22*
U.S. Cl. 241—182 **8 Claims**

1. A longitudinal metal liner for lining the interior peripheral wall of a grinding mill,

said metal liner having a grinding surface and being formed of a plurality of segments comprising a first segment, a second segment and at least a third segment,

each segment having at least one inclined end face, at least one segment following said first segment having both end faces inclined such that the angle between said end inclined faces diverges toward the grinding surface of said liner,

said segments of the liner being cooperably longitudinally and coaxially arrangeable with the inclined end faces thereof disposed in end-to-end overlapping relationship,

whereby when said segmented liner secured to the inner peripheral wall of said grinding mill is subjected to the

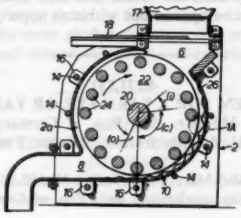
working stresses of grinding media on the grinding surface of said liner, the stresses applied to the metal liner result in the generation of a vertical lifting force on at least said segment having divergent end faces due to linear strain caused by metal flow along the liner which aids in the subsequent removal of said segmented liner for maintenance purposes.

4,231,529

IMPACT DECORTICATOR

Norman J. Peck, Seven Hills; Thomas J. Rowland, Whalan, and John R. Ashes, Baulkham Hills, all of Australia, assignors to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

Filed Jul. 11, 1978, Ser. No. 923,688
Int. Cl.³ B02C *13/282*
U.S. Cl. 241—189 R **19 Claims**

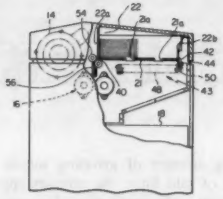


1. An impact decorticator having a rotor mounted for rotation about a substantially horizontal axis in a generally concentric and cylindrical casing having an internal surface and provided at the upper portion thereof with an inlet opening and in the lower portion thereof with an outlet opening for the material being processed, said impact decorticator being characterised in that graded, substantially horizontally extending ripples are formed on the internal surface of the casing between the inlet and outlet (in the direction of rotor rotation), said ripples having generally flat surfaces and being graded in that they become progressively sharper from the vicinity of the inlet opening, toward a central zone between the inlet and outlet openings the surfaces of the ripples which face opposite the direction of rotation having angles of presentation which decrease from about 85° in the vicinity of the inlet opening to a minimum of about 50° in the central zone, the angle of presentation being the angle between a respective flat surface which faces opposite the direction of rotation and a radial line drawn from the axis of rotation of the rotor to the bottom of that surface.

4,231,530
AUTOMATIC DOCUMENT SHREDDER

Takefumi Hatanaka, No. 276-19, Higashihiraga, Matsudo-shi, Chiba-ken, Japan

Filed Dec. 22, 1978, Ser. No. 972,471
Claims priority, application Japan, Nov. 15, 1978, 53-139772
Int. Cl.³ B02C *18/22*
U.S. Cl. 241—223 **7 Claims**

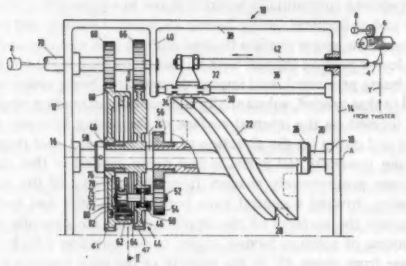


1. A document shredder for shredding waste documents into unintelligible form, comprising:
- a casing;
- means in said casing for shredding said waste document into said unintelligible form;
- stand-by chamber means provided in said casing for accommodating a plurality of said waste documents to be shredded, said plurality of waste documents being placed in said stand-by chamber in a stacked condition prior to said shredding;
- at least one partitioning member detachably disposed in said stand-by chamber means to divide said stand-by chamber means into a plurality of compartments corresponding to the sizes of said waste documents; and
- an automatic feeding mechanism for automatically and simultaneously feeding a prescribed number of sheets of said waste documents from each of said plurality of compartments to said shredding means in a batch-wise manner;
- said stand-by chamber means and said automatic feeding mechanism being provided within an upper portion of said casing.

4,231,531
DRIVE SYSTEM FOR A YARN EYE OR YARN WINDER

Aloys Greive, Münster, Fed. Rep. of Germany, assignor to Hamel GmbH, Zwirnmaschinen, Münster, Fed. Rep. of Germany

Filed Mar. 29, 1979, Ser. No. 25,182
Claims priority, application Fed. Rep. of Germany, Apr. 5, 1978, 2814759
Int. Cl.³ B65H *54/38*
U.S. Cl. 242—18.1 **10 Claims**

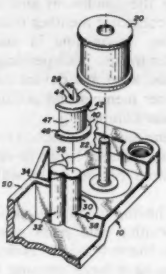


1. In an arrangement wherein a yarn is fed at a generally uniform delivery speed through a yarn eye to a yarn package rotated at a generally uniform peripheral speed, and wherein the yarn eye is reciprocated with a nonuniform speed adjacent the package to wind the yarn irregularly on the package, a drive system comprising:
- a planet carrier rotatable about a main axis;
- a planet gear rotatable on said carrier and orbitable therewith about said axis;
- an output gear in mesh with said planet gear;
- a cam rotationally coupled to said output gear and jointly rotatable therewith;
- means including a cam follower connected between said cam and said yarn eye for reciprocating said eye at a speed generally proportional to the rotation speed of said cam;
- a control wheel rotatable about said axis and having a pair of angularly offset control regions;
- means including an input adapted to be rotated at a substantially constant speed and a pair of outputs respectively connected to said carrier and control wheel for rotating same at substantially constant but different angular speeds;
- an entrainment element engageable with said regions of said control wheel and rotationally coupled to said planet gear; and
- control means including respective formations on said control regions for rotating said cam at one predetermined speed when said element engages one of said regions and for rotating said cam at another different speed when said element engages said other region.

4,231,532
TAPE CASSETTE WITH IMPROVED TAPE GUIDING

George D. Popov, Milpitas, and Howard W. Robinson, San Jose, both of Calif., assignors to Verbatim Corporation, Sunnyvale, Calif.

Filed Jul. 30, 1979, Ser. No. 61,653
Int. Cl.³ G03B *1/04*; G11B *15/32*
U.S. Cl. 242—199 **8 Claims**



1. A precision tape cassette with improved vertical tape tracking accuracy comprising:
- a cassette shell having a base and forming a first frontal corner, a second frontal corner and a space along a frontal path intermediate said first and second frontal corners, said space being provided to receive a magnetic recording/reproducing head to interface with a magnetic tape transported along said frontal path;
- a first corner guiding element positioned adjacent said first frontal corner and protruding vertically from said base of the shell;
- a second corner guiding element positioned adjacent said second frontal corner and protruding vertically from said base of the shell;
- a first pair of integral arcuate segments forming a first 8-shaped boss protruding vertically from the shell along an axis parallel to the axis of said first corner guiding element, the first boss being integral with the shell and interposed intermediate the first corner guiding element and said space;
- a first arcuate stationary guide member having a central arcuate channel of greater than 180° and less than 360°, the

first guide member being interlocked with the first boss and coaxial therewith, the first arcuate guide member having flanges at opposite ends to form a substantially U-shaped groove, the first stationary guide member being positioned to interface with the transported tape in said groove;

a first arcuate depression within said base and coaxial with the first arcuate guide member with one flange of the first guide member being seated within said first depression;

a second pair of integral arcuate segments forming a second 8-shaped boss protruding vertically from the shell along an axis parallel to the axis of the second corner guiding element, the second boss being integral with the shell and interposed intermediate the second corner guiding element and said space;

a second arcuate stationary guide member having a central arcuate channel of greater than 180° and less than 360°, the second guide member being interlocked with the second boss and coaxial therewith, the second arcuate guide member having flanges at opposite ends to form a substantially U-shaped groove, the second stationary guide member being positioned to interface with the transported tape in said groove; and

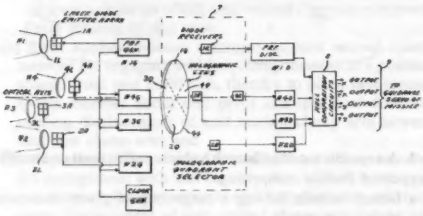
a second arcuate depression within said base and coaxial with the second arcuate guide member with one flange of the second guide member being seated within said second depression.

4,231,533

STATIC SELF-CONTAINED LASER SEEKER SYSTEM FOR ACTIVE MISSILE GUIDANCE

Richard F. Durig, Xenia, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jul. 9, 1975, Ser. No. 593,597
Int. Cl.³ F42B *15/02;* F41G *7/24, 7/26*
U.S. Cl. 244—3.16 **1 Claim**



1. A static target seeker system for providing active missile guidance signals comprising:

a. a first laser diode array emitting an optical beam modulated by a first pulse repetition frequency;

b. a second laser diode array emitting an optical beam modulated by a second pulse repetition frequency;

c. a third laser diode array emitting an optical beam modulated by a third pulse repetition frequency;

d. a fourth laser diode array emitting an optical beam modulated by a fourth pulse repetition frequency;

e. means for placing the said four optical beams in respective quadrature relationship about an optical axis;

f. a holographic quadrant selector lens plate positioned on the said optical axis, the said lens having a quadrature focal point for each quadrant;

g. a diode detector positioned at each said focal point;

h. a discriminator associated with each diode, each discriminator providing an output substantially responsive only to signals from the respective corresponding emitting array; and

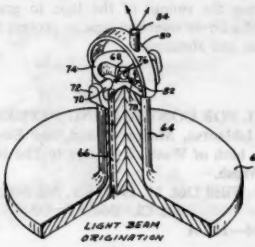
i. a null comparison circuit receiving the outputs from the said discriminators and providing target guidance signals to the said missile.

4,231,534

ACTIVE OPTICAL TRACKING SYSTEM

Robert J. Lintell, Altadena, and James D. Campbell, Pasadena, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 4, 1977, Ser. No. 850,101
Int. Cl.³ F42B *15/02*
U.S. Cl. 244—3.16 **1 Claim**



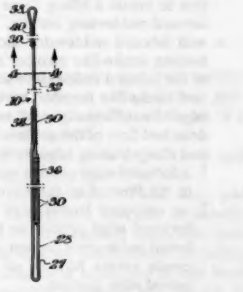
1. Optical radiation transmitting means for active optical tracking systems in missiles comprising: a base, a post mounted on the base having an aperture therethrough, parallel to the longitudinal axis of the post; an inner gimbal mounted on one end of the post including a yoke, a pin extending from the yoke and a movable gimbal ring; an outer movable gimbal ring connected to the inner gimbal ring including a pin extending through the inner gimbal ring; a diverging lens mounted on said outer gimbal ring; a first mirror means mounted on the yoke pin adapted to receive radiation passing through said aperture; a second mirror mounted on the inner gimbal adapted to receive radiation from the first mirror and a third mirror mounted on the outer gimbal pin adapted to receive radiation from the second mirror and direct said radiation through the diverging lens.

4,231,535

COMPOSITE TAPE FOR ARRESTING LANDING AIRCRAFT

William R. Schlegel, and Harry E. Mayhew, both of Wilmington, Del., assignors to All American Industries, Inc., Thomaston, Conn.

Continuation of Ser. No. 803,479, Jun. 6, 1977, abandoned. This application Oct. 27, 1978, Ser. No. 955,420
Int. Cl.² B64F *1/02*
U.S. Cl. 244—110 C **11 Claims**



1. A composite elongated woven tape connected to and

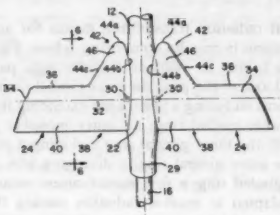
wrapped around a rotary energy absorber for arresting a landing aircraft in conjunction with cross-runway pendant means comprising a relatively short leading section having longitudinal filaments with a relatively low modulus of elasticity comprising final wrappings about the rotary energy absorber whereby the impact shock created when the aircraft is first arrested is absorbed connected to a longer trailing section having longitudinal filaments with a relatively high modulus of elasticity comprising initial wrappings about the rotary energy absorber whereby high tensile strength, high velocity of stress wave propagation and reduced mass moment of inertia are provided, the leading section being connected to the cross-runway pendant means, the trailing section being connected to the energy absorber whereby the trailing section is brought into action during the runout of the tape to gradually stop the aircraft, and a cover over the tape to protect it from exposure to sun, wear and abrasion.

4,231,536

AIRFOIL FOR CONTROLLING REFUELING BOOM

Kichio K. Ishimitsu, Mercer Island, and Edward N. Tinoco, Bellevue, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Oct. 11, 1977, Ser. No. 840,589
Int. Cl.[2] B64D *39/00*
U.S. Cl. 244—135 A **9 Claims**



1. In a refueling boom having a longitudinal axis and mounted to an aircraft, a ruddevator assembly to act on flow of air over the ruddevator assembly to control movement and position of the boom, said ruddevator assembly comprising:

a pair of ruddevators mounted to said boom at a dihedral angle to create both vertical and lateral lift components, each of said ruddevators having a spanwise axis and a chordwise axis, each ruddevator being mounted for rotation about an axis generally aligned with its spanwise axis, each ruddevator comprising:

a. an outboard ruddevator section having an airfoil configuration with a leading edge shaped to cause attached flow over the outboard ruddevator section to create a lifting force caused by airflow over said outboard ruddevator section,

b. an inboard ruddevator section having an airfoil configuration to create a lifting force caused by airflow over said inboard ruddevator section,

c. said inboard ruddevator section having a forwardly extending strake-like member mounted to the forward end of the inboard ruddevator section,

d. said strake-like member having a relatively sharp leading edge of a sufficiently small cross sectional radius to create detached flow of the air flow over said sharp leading edge, said sharp leading edge having three portions, namely,

1. a forward edge portion positioned generally transverse to the flow of air thereover,

2. an outboard lateral edge portion extending from the forward edge portion to the leading edge of the outboard ruddevator section at a sweep angle sufficient to create vortex flow of air passing over said outboard lateral edge portion,

3. an inboard lateral edge portion extending from the forward edge portion rearwardly along the inside edge of the ruddevator, the angular position of the inboard lateral edge portion being such that with the refueling boom extending at a downward angle from its associated aircraft so as to be positioned at an angle to the airstream, and with each ruddevator being positioned at an angle of attach such that the chordwise axis of each ruddevator is slanted with respect to a plane containing the lengthwise axis of the boom, the inboard lateral edge portion of the strake-like member extends into the airstream at a sweep angle sufficient to create vortex flow of air passing over said inboard lateral edge portion,

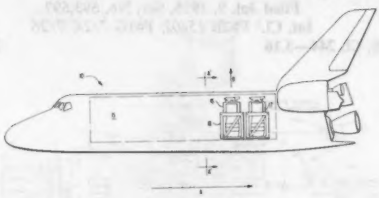
whereby said ruddevators are able to create relatively high lift forces at relatively high angles of attack and under conditions of yaw of the boom where the sweep angles of the ruddevators are subject to variation.

4,231,537

SATELLITE-LAUNCH VEHICLE COMBINATION AND METHOD

Michael T. Lyons, Fairfax, Va., assignor to Satellite Business Systems, McLean, V.I.

Filed Mar. 22, 1978, Ser. No. 889,087
Int. Cl.[2] B64G *1/00*
U.S. Cl. 244—160 **14 Claims**



1. A reusable satellite launch vehicle and at least one satellite supported therein comprising:

a launch vehicle having a cargo bay of given dimensions with a thrust axis,

satellite cradle means mounted within said cargo bay for support of a satellite thereby,

said satellite mounted within said cradle means and including at least one source of major thrust defining a major thrust axis for said satellite,

said cradle means supporting said satellite with said major thrust axis substantially perpendicular to said launch vehicle thrust axis.

11. A method of adapting a satellite intended for quasi-synchronous orbit for efficient launch via a reusable launch vehicle with defined cargo bay to minimize use of launch vehicle payload capability comprising the steps of:

providing said satellite with at least one major thrust motor such as an apogee kick motor whose orientation defines a major thrust axis for said satellite,

dimensioning said satellite so that when mounted for launch said satellite lies within a portion of said cargo bay wherein the improvement comprising:

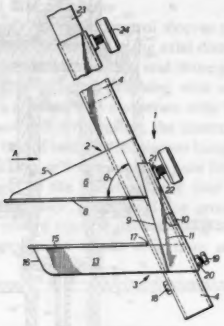
dimensioning said satellite to fit within said cargo bay with said major thrust axis at an angle of about 90° to a launch vehicle thrust axis.

4,231,538

CLAMPING DEVICES

Keith B. Lithgow, Bletchley, England, assignor to Microform Communications Limited, Bletchley, England

Filed Oct. 11, 1978, Ser. No. 950,405
Claims priority, application United Kingdom, Oct. 12, 1977, 42474/77
Int. Cl.³ E04G 3/00
U.S. Cl. 248—226.1 4 Claims



1. A clamping device, comprising
(a) a first clamp member (2) including
(1) an elongate base (4) having smooth parallel sides; and
(2) a first clamp arm (5) extending laterally outwardly from the base;
(b) a second clamp member (3) mounted for sliding movement along said base, said second clamp member including
(1) a second clamp arm (16) extending laterally outwardly from said base opposite and generally parallel with said first clamp arm; and
(2) pivot means (19) on said second clamp member for engaging the side surface of said base which is remote from said first and second clamp arms, thereby to define a pivot axis about which said second clamp arm is pivotable relative to said base;
(c) force applying means arranged on said second clamp member for engaging said first clamp member at a position spaced from said pivot axis, thereby to pivot said second clamp member about said pivot axis in a first direction causing displacement of said second clamp arm toward said first clamp arm; and
(d) stop means (17) arranged on said second clamp member for engagement with said base member to limit rotation of said second clamp member in said first direction, whereby upon displacement of said second clamp member to any desired position relative to said base member, said force applying means may be operated to pivot said second clamp member in said first direction about said pivot axis and thereby displace said stop means toward locking engagement with said base member.

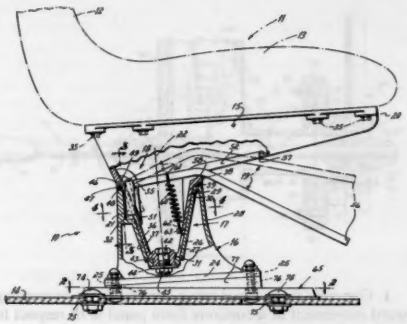
4,231,539

PEDESTAL SEAT BASE

Edwin C. Sandham, Thiensville, Wis., assignor to Leggett & Platt, Incorporated, Carthage, Mo.

Continuation-in-part of Ser. No. 874,235, Feb. 1, 1978, abandoned. This application Apr. 5, 1979, Ser. No. 27,464
Int. Cl.³ F16M 13/00
U.S. Cl. 248—418 6 Claims

1. An improved pedestal base for a seat comprising
a seat support and a pedestal, said seat support being connectable with said seat, and said pedestal being connectable with a support surface,
a vertical thrust bearing partially carried by said seat support and partially carried by said pedestal, said vertical thrust bearing comprising an inner bearing collar and an outer bearing collar, said inner and outer bearing collars defining side walls having a generally conical cross-sectional configuration, and said inner and outer bearing collars being nested one within the other so that the side walls of said bearing collars function as bearing surfaces, and
a latch device for restraining said seat support and said pedestal in a centered position, said latch device comprising a latch dog movable through a latch port defined in



the conical side wall bearing surface of one of said bearing collars into a latch port defined in the conical side wall bearing surface of the other of said bearing collars for preventing rotation of said seat support relative to said pedestal by latching said seat support in a preferred position, and a handle connected to said latch dog for allowing rotation of said seat support relative to said pedestal by removing said latch dog from latching relation with said latch seat.

4,231,540

MIRROR CONNECTOR

Rodney A. Duncan, 1521 Pound Dr., Flint, Mich. 48504, and Wendel W. Hall, 351 Beach, Mt. Morris, Mich. 48458

Filed Dec. 14, 1978, Ser. No. 969,422
Int. Cl.² A47G 1/24
U.S. Cl. 248—487 4 Claims

1. A mirror connector for a rectangular rear view mirror having a substantially L-shaped support stem which is normally secured through an aperture in a horizontal flange of a support frame, said connector comprising:
an elongated stem having an axial bore at its lower end adapted to threadably receive a bolt therein, and
a head portion secured to the upper end of said stem, and including a transverse throughbore adapted to slidably receive a shank of the L-shaped support stem, said head portion further including an axial throughbore extending from said transverse throughbore to the top of said head portion adapted to threadably receive a bolt therein to secure said shank within said transverse throughbore.

4,231,541

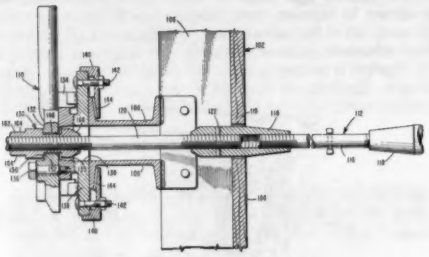
CONCRETE FORM PANEL TYING APPARATUS

James K. Strickland, Jacksonville, Fla., assignor to Strickland Systems, Inc., Jacksonville, Fla.

Continuation-in-part of Ser. No. 576,861, May 12, 1975, abandoned, and Ser. No. 576,862, May 12, 1975, Pat. No. 4,044,986. This application Aug. 22, 1977, Ser. No. 826,834

Int. Cl.³ E04G *17/08*

U.S. Cl. 249—216 **28 Claims**



1. Concrete form panel tying apparatus for restraining outward movement of a concrete form panel with respect to a tie passing therethrough, said apparatus comprising:

a tie extendable outwardly through an opening in said concrete form panel,

an outer end portion on said tie having a first transverse dimension,

an inner end portion on said tie located inwardly of said outer end portion and having a second transverse dimension less than said first transverse dimension,

an outwardly inclined tie surface extending between said outer end portion and said inner end portion, and curved about the longitudinal axis of said tie,

clamping means operatively associated with said tie for engaging said tie, said clamping means being positionable between said inclined surface and said concrete form panel and comprising a first clamping member having a first recess of transverse dimension greater than said second transverse dimension and less than said first transverse dimension to accommodate said tie therein, said clamping member being at an angle to the longitudinal axis of said tie, said first recess being defined at least in part by an outwardly inclined clamping surface complementary to said inclined tie surface and engageable therewith, said first clamping member being movable radially with respect to said tie between an engaged position wherein said clamping surface is in engagement with said tie surface to restrain said concrete form panel against outward movement with respect to said tie and a disengaged position wherein said inclined surfaces are not engaged with one another, and

means operatively associated with said clamping means for releasably holding said first clamping member in said engaged position.

4,231,542

AUTOMATICALLY RESETTING FLUSH VALVE

Wilfred J. Grenier, Rutland, Mass., assignor to General Industries, Inc., Rutland, Mass.

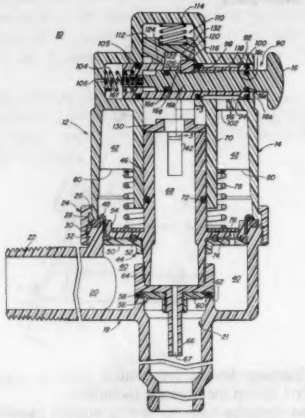
Filed Aug. 9, 1978, Ser. No. 932,299

Int. Cl.³ F16K *21/04, 31/385*

U.S. Cl. 251—15 **3 Claims**

1. In a flush valve having a housing, a moveable partition sealingly engaging the housing and defining a primary chamber and a control chamber, an inlet port in the primary chamber and an outlet port in the primary chamber, and a valve element connected with the partition for closing the outlet port, the improvement comprising:

an actuator mechanism including an actuator valve connected with said control chamber; an actuator member for setting said actuator valve to the open position to vent said control chamber and enable said valve element to move away from said outlet port and open said flush valve; and an automatic release member moveable with said actuator member for setting said actuator valve to the open position and moveable independently of said actuator member to reset said actuator valve to the closed position; and



an actuator control mechanism driven by said partition as said valve element moves away from said outlet port, enables said automatic release member to reset said actuator valve to the closed position and cease venting said control chamber.

4,231,543

CONTROLLABLE HYDRAULIC VALVE MECHANISM FOR RECIPROCATING ENGINES OR PUMPS

Hansjürgen Zürner, Ammerndorf, and Wolfgang Fuhrmann, Nuremberg, both of Fed. Rep. of Germany, assignors to Maschinenfabrik Augsburg-Nürnberg Aktiengesellschaft, Nuremberg, Fed. Rep. of Germany

Filed Jun. 11, 1979, Ser. No. 47,322

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1978, 2825316

Int. Cl.³ F16K *31/122;* F16L *1/34, 9/02*

U.S. Cl. 251—57 **10 Claims**

1. A controllable hydraulic valve mechanism, especially for reciprocating engines and pumps, which includes:

a valve;

a drive cylinder;

a drive piston which projects into said drive cylinder, is operable by a cam, and is provided with control edges, said drive cylinder being adapted to have an interior space at that end of said drive piston remote from said cam;

a working cylinder;

a working piston which is guided in said working cylinder, operates said valve directly, and is provided with an oblique end face at that end thereof remote from said valve, said working cylinder being adapted to have an interior space at that end of said working piston remote from said valve;

a control conduit which interconnects said cylinders;

a first reservoir for control fluid;

a refilling conduit which interconnects said first reservoir and said drive cylinder;

a cooler arranged in said refilling conduit;

a pump operatively connected with said refilling conduit;

a return conduit interconnecting said refilling conduit and said first reservoir;

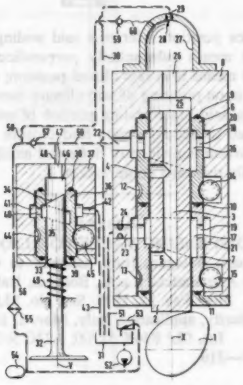
an overflow valve located in said return conduit;

a second reservoir for absorbing a substantial part of the energy produced by the lift of said cam;

means for providing a continuous communication between said drive cylinder interior space and said second reservoir, said second reservoir, at that portion thereof remote from said means, being provided with a bore having a restriction;

a discharge conduit interconnecting said second reservoir bore and said first reservoir;

two independently rotatable control sleeves arranged end-to-end in said drive cylinder in the axial direction thereof, said control sleeves surrounding said drive piston, each of said control sleeves being provided with a control ring groove which is adapted to cooperate with the pertaining control edge of said drive piston, the control ring groove pertaining to one of said control sleeves being connectable with said working cylinder interior space for infinite variable adjustment of the valve opening time of said drive cylinder interior space, the control ring groove pertaining to the other of said control sleeves being connectable to said first reservoir by means of a bore and pertaining



restriction in said drive cylinder for infinitely variable adjustment of the valve closing time of said drive cylinder interior space;

actuating means respectively operatively associated with each of said control sleeves for respectively effecting rotation thereof, said actuating means being operable from outside said drive cylinder;

a further rotatable control sleeve arranged in said working cylinder and surrounding said working piston, said further control sleeve being provided with a control ring groove for varying the lift of said valve;

a discharge conduit which leads to said first reservoir and is connectable to said working cylinder interior space by means of said further sleeve, said oblique end face of said working piston, and said control ring groove of said further control sleeve, being adjusted in such a way that a small amount of control fluid flows into said first reservoir during each valve lift adjustment; and

further actuating means operatively associated with said further control sleeve for effecting rotation thereof, said further actuating means being operable from outside said working cylinder.

4,231,544

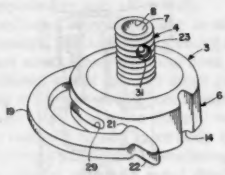
LOCKING CRANKCASE DRAIN VALVE ASSEMBLY

Duane C. Balch, 3827 Briarwood St., Napa, Calif. 94558

Filed Apr. 19, 1979, Ser. No. 31,466

Int. Cl.³ F16K *1/20*

U.S. Cl. 251—144 **5 Claims**



1. A locking crankcase drain valve assembly comprising:

a. a valve housing (3) having an outer wall for mounting in the drain opening (2) of a crankcase (1), including:

(1) a shank portion (4) for mounting in said drain opening,

(2) a valve body portion (6) integrally connected to said shank portion,

(3) a central passage (7) through said shank and valve body portions having an inlet (8) in said shank portion and an outlet (9) in said valve body portion,

(4) a valve body opening (11) formed in said valve body portion extending transversely through said central passage and forming a valve seat (12) surrounding said central passage,

(5) hinge attachment means (13) formed in said valve body portion positioned offset from said central passage,

(6) lever holding means (14) formed in said valve body portion at a selected distance from said hinge attachment means;

b. a valve member (16) formed for receipt within said valve opening and formed with pivot means (17) for pivotal attachment to said hinge means including,

(1) a seat portion (18) formed for sealing engagement with said valve seat surrounding said central passage,

(2) a spring lever (19) extending beyond said valve body portion having engaged and unengaged positions,

(3) lever attachment means (21) formed in said lever at a selected distance from said hinge attachment means (13) which in its unstressed state is less than the distance of said lever holding means (14) from said hinge attachment means (13) for engaged attachment to said lever holding means (14) so that when said lever is in said engaged position said lever is in tension,

(4) grip means (22) extending from said lever for receiving a finger or tool for moving said lever and thereby moving said valve member in and out of sealing engagement with said central passage;

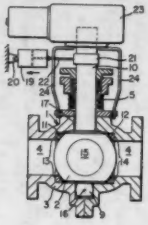
c. said valve body opening in said valve body portion is formed with a tapered portion (24) in the area forming said valve seat; and

d. said valve member is formed with a tapered portion (26) in the area registering with said tapered portion of said valve opening in said valve body portion so that when said lever is in said engaged position, said tapered portion (26) is in compression with said tapered portion (24) of said valve body.

4,231,545
HIGH PRESSURE BALL VALVE WITH TIPPING ACTION

Juha A. E. Nelimarkka, Marjalahdentie 8, 00930 Helsinki 93, Finland

Filed Nov. 28, 1977, Ser. No. 855,335
Claims priority, application Finland, Dec. 3, 1976, 763488
Int. Cl.³ F16K 5/06
U.S. Cl. 251—161 5 Claims



1. A ball valve comprising a body provided with a flow channel; a generally ball-shaped rigid closing organ; sealing rings fitted into ring-shaped and transverse grooves in the valve body on both sides of said closing organ; a pair of spindles associated with said closing organ and provided extending from opposite sides thereof for receipt by said body and mounting said organ so that the pressure of fluid on said organ tips said organ into sealing engagement against a said sealing ring; and

means for actuating said organ to rotate it with respect to said body to effect opening and closing of said flow channel, said means including one of said spindles extending through said body to the exterior thereof through a sealing mechanism; a bellows capable of withstanding pipe pressure while remaining flexible to permit tipping of said closing organ, said bellows operatively connected to said valve body and said sealing mechanism so that low-torque turning of said organ is effected by pivoting said one spindle so that a line through said spindle is transverse to said flow channel and thus said organ is moved out of tipping engagement with a said sealing ring, and subsequent rotation of said one spindle and said organ.

4,231,546
HIGH-TEMPERATURE BIDIRECTIONAL METAL SEAL

Philip W. Eggleston, and Eugene R. Taylor, Jr., both of Marshalltown, Iowa, assignors to Fisher Controls Company, Inc., Marshalltown, Iowa

Continuation of Ser. No. 619,133, Oct. 2, 1975, abandoned. This application Dec. 22, 1978, Ser. No. 972,568
Int. Cl.³ F16K 25/00
U.S. Cl. 251—173 5 Claims

1. A valve seal structure comprising:

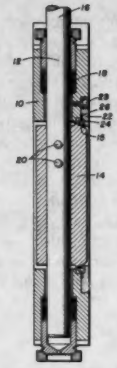
a unitary metallic annular seal member having an inner sealing portion of generally U-shaped cross section, a resilient flexible web portion extending generally outwardly from said sealing portion, and an outer periphery extending outwardly from said web portion, and including a locus of flexure points at the junction of said web and said periphery;

a valve body having a central bore and means within said bore for sealingly engaging said periphery of said seal;

valve closure means pivotable within said bore between open and closed positions, said closure means having a circumferential sealing surface converging generally toward an axis of said body bore for sealingly engaging said sealing portion of said seal in an interference fit in a region of contact when said closure means is in a closed position;

said locus of flexure points being displaced in the direction of convergence of said sealing surface of said closure means from said region of contact between said seal member and said closure means,

wherein said generally U-shaped cross section of said seal member sealing portion defines a center of curvature of said cross section, and wherein an imaginary line through said center of curvature of said U-shaped cross section and said locus of flexure points when said closure means is in



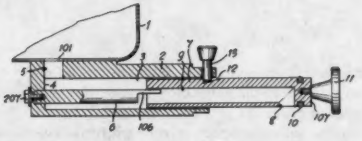
the open position intersects said sealing surface of said closure means substantially perpendicularly when said closure means is in said closed position; and

whereby upon pivoting of said closure means to said closed position, said inner sealing portion of said seal is radially stretched to accommodate said closure means, and said web portion is resiliently deflected axially and placed in generally outward compression.

4,231,547
DISPENSING VALVE FOR LIQUIDS

Ezio Manfroni, Bologna, Italy, assignor to Carpigiani Bruto Macchine Automatiche S.p.A., Bologna, Italy

Filed Feb. 22, 1979, Ser. No. 13,810
Claims priority, application Italy, Mar. 1, 1978, 12500 A/77
Int. Cl.³ F16K 31/00; A23G 9/00
U.S. Cl. 251—210 4 Claims



1. A dispensing valve for liquids comprising:

a first tubular member closed at one end, completely opened at its other end, and including an inlet port through the side thereof near the closed end,

a second tubular member telescopically slidably housed in the first tubular member and completely open at its end which faces the said closed end of the first tubular member and completely closed at its opposite end, the open end of the second tubular member being movable to abut the said closed end of the first tubular member, said second tubular member having an outlet port through the side thereof near the closed end of the second tubular member, said second tubular member being of a length relative to the first tubular member that in a closed position whereat the open end of the second tubular member abuts the closed end of the first tubular member, the outlet port is wholly within the first tubular member,

stop means for limiting the maximum outward stroke of the

second tubular member away from its closed position toward an open position,

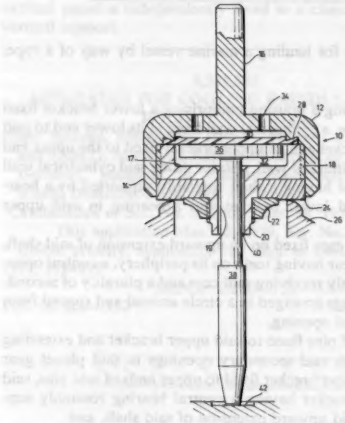
and a piston member fixed at one of its ends to the closed end of the first tubular member and extending therefrom into the interior of the second tubular member and at least a portion of said piston having an outer diameter which closely fits the interior of the second tubular member to substantially prevent fluid flow between the piston member and the interior of the second tubular member when the second tubular member engages the portion of the piston member, said portion extending from said closed end of the first tubular member outwardly farther than said inlet port but less than the said maximum outward stroke of the second tubular member.

4,231,548

BALANCE VALVE DISC AND SEAT STRUCTURE

Heinz W. Braukmann, Willowdale, Canada, assignor to Braukmann Armaturen AG, Rothrist, Switzerland

Filed Aug. 2, 1978, Ser. No. 930,223
Int. Cl.³ F16K *39/02*
U.S. Cl. 251—282 **6 Claims**



1. A balanced valve disc and seat structure having a hollow valve disc engageable with said seat, pressure responsive means supported in said disc, said pressure responsive means dividing said hollow valve disc into separate first and second chambers, a first aperture in said disc communicating with said first chamber, a second aperture in said disc communicating with said second chamber, a plunger having one end secured to said pressure responsive means, the other end of said plunger extending through said second chamber and said valve seat and means engaging said other end of said plunger when said first chamber has a higher pressure than said second chamber.

4,231,549

VALVE STEM AND VALVE DISC CONNECTION FOR A DIAPHRAGM VALVE

Robert G. Visalli, Murrysville, Pa., assignor to Kerotest Manufacturing Corp., Pittsburgh, Pa.

Filed Dec. 11, 1978, Ser. No. 967,912
Int. Cl.³ F16K *31/44*
U.S. Cl. 251—335 A **10 Claims**

1. A diaphragm valve comprising,

a valve body having a chamber therein with an upper portion and a lower portion,

said lower portion having inlet and outlet openings communicating with said chamber lower portion,

a valve seat in said chamber lower portion between said inlet and outlet openings,

a valve assembly positioned in said chamber lower portion in overlying relation with said valve seat and arranged to control the flow of fluid through said chamber lower portion, a flexible metal diaphragm assembly positioned in said chamber in overlying abutting relation with said valve assembly,

said metal diaphragm assembly arranged to seal said chamber lower portion from said chamber upper portion,

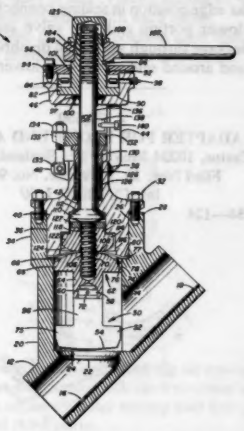
said metal diaphragm assembly having an outer annular edge portion supported by said valve body,

said metal diaphragm assembly having an axial bore extending therethrough, said axial bore forming an inner annular edge portion surrounding said axial bore,

a bonn t positioned in said chamber upper portion in overlying abutting relation with said metal diaphragm assembly outer annular edge portion to thereby secure said metal diaphragm assembly to said valve body and said bonnet,

said bonnet having a passageway therethrough, said passageway being aligned with said metal diaphragm assembly axial bore,

a threaded stem extending through said bonnet passageway and positioned within said bonnet passageway for nonrotational longitudinal movement relative thereto,



said valve stem having an upper portion extending above said bonnet and a lower portion extending through said bonney passageway and through said metal diaphragm assembly axial bore,

said metal diaphragm assembly inner annular edge portion being sealingly engaged with said valve stem lower portion,

said metal diaphragm assembly having a body portion extending outwardly from said inner annular edge portion to said outer annular edge portion,

said body portion having substantially unsupported upper and lower surfaces thereby permitting said body portion to pivot freely about the connection of said metal diaphragm assembly to said valve body and said bonnet while maintaining said metal diaphragm assembly inner annular edge portion sealingly engaged with said valve stem lower portion,

said valve stem lower portion being connected to said valve assembly,

actuator means axially mounted on and secured to said valve stem upper portion for moving said valve stem axially relative to said bonnet so that said valve assembly moves positively into and out of sealing relation with said valve seat,

a diaphragm stem clamp positioned on said valve stem lower

portion to engage one side of said metal diaphragm assembly inner annular edge portion and form a fluid tight seal between said valve stem lower portion, said valve assembly, and said metal diaphragm assembly, said valve assembly engaging an opposite side of said metal diaphragm

said diaphragm stem clamp being urged into clamping engagement with said metal diaphragm assembly inner annular edge portion with said metal diaphragm assembly body portion being substantially unsupported and freely flexible between said inner and outer annular edge portions, and

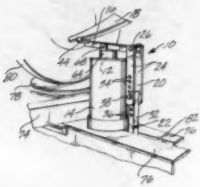
said metal diaphragm assembly being maintained in sealing engagement with said valve stem and said valve assembly valve stem and said valve assembly said diaphragm stem clamp being axially secured to said valve stem lower portion, said diaphragm stem clamp having a threaded axial bore for receiving said valve stem lower portion, said diaphragm stem clamp having a lower surface positioned in overlying abutting relation with said metal diaphragm assembly inner annular edge portion so that said metal diaphragm assembly is sealingly connected to said valve stem, and locking means threadably secured to said valve stem lower portion and abutting said diaphragm stem clamp for transmitting a downward axial force through said diaphragm stem clamp to said metal diaphragm assembly to maintain said metal diaphragm assembly inner annular edge position in sealing connected with said valve stem lower portion and said valve assembly to prevent fluid leakage through said metal diaphragm assembly axial bore and around said valve stem lower portion.

4,231,550

JACK ADAPTER FOR FRONT END ALIGNMENTS

John H. Castoe, 10234 McVine St., Sunland, Calif. 91040

Filed Nov. 23, 1979, Ser. No. 96,628
Int. Cl.³ B66F *3/00*
U.S. Cl. 254—124 **11 Claims**



1. An adapter for attachment to a vertical jack for lifting against the steering control arm of a vehicle to jack up the vehicle in a safe position comprising:

an elongated rocker arm having a working end and a remote end opposite its working end;

jack attachment means pivotally secured to the rocker arm between the working end and the remote end of the rocker arm, the jack attachment means extending downwardly from the rocker arm and being configured for releasable attachment to the ram of a jack;

control arm attachment means secured to and projecting upwardly from the working end of the rocker arm for engaging a steering control arm of the vehicle to secure the rocker arm in a fixed position relative to said control arm; and

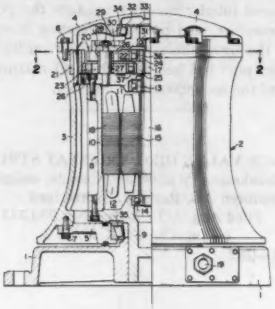
a rigid support arm pivotally secured to the remote end of the rocker arm, the support arm extending downwardly from the rocker arm and having fastening means spaced from the remote end of the rocker arm for attachment to a fixed point to maintain the remote end of the rocker arm at a fixed elevation as the rocker arm pivots through an angle about an axis through the remote end of the rocker arm in response to an upward stroke of the ram of the jack applied to the jack attachment means.

4,231,551

CAPSTAN

Mankichi Ikeda, Shimizu, Japan, assignor to Kabushiki Kaisha Ikeda Seisakusho and Sugita Sangyo Kabushiki Kaisha, both of Tokyo, Japan

Filed May 25, 1978, Ser. No. 909,644
Int. Cl.³ B66D *1/30*
U.S. Cl. 254—344 **4 Claims**



1. A capstan for hauling a marine vessel by way of a rope, comprising:

a base,

a motor having a housing comprising a lower bracket fixed to said base, a cylindrical wall fixed at its lower end to said lower bracket and an upper bracket fixed to the upper end of said cylindrical wall, a stator inside said cylindrical wall and a rotor having a shaft rotatably supported by a bearing in said lower bracket and a bearing in said upper bracket,

an eccentric cam fixed on an upward extension of said shaft, a planet gear having teeth on its periphery, a central opening rotatably receiving said cam and a plurality of secondary openings arranged in a circle around and spaced from said central opening,

a plurality of pins fixed to said upper bracket and extending up through said secondary openings in said planet gear and a support bracket fixed to upper ends of said pins, said support bracket having a central bearing rotatably supporting said upward extension of said shaft, and

a drum comprising a generally cylindrical body surrounding said motor and having a negative crown, a top cover fixed to an upper end of said body and a bottom cover fixed to a lower end portion of said body, means rotatably supporting said drum comprising a lower bearing in a central opening of said bottom cover bearing on a downwardly extending central portion of said lower bracket and an upper bearing in a central recess of said top cover and bearing on an upwardly projecting central portion of said support bracket, and an internal ring gear fixed in an upper portion of said body in position to mesh with said planet gear and having at least one more teeth than said planet gear.

4,231,552

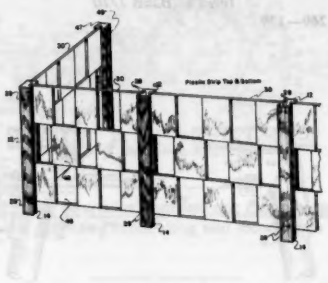
RESIDENTIAL FENCE

Clifford F. Thomas, 286 Main St., Bishop's Falls, Newfoundland AOHICO

Filed May 24, 1978, Ser. No. 909,041
Int. Cl.³ E04H *17/16*
U.S. Cl. 256—24 **1 Claim**

1. A fence comprising a plurality of rigid, intermediate vertical supports; said supports being spaced apart; said supports being generally rectangular in cross-section and having longitudinal channels on opposite side walls; and corner and terminal support members each having at least one longitudinal

channel therein; vertical panels having edge portions detachably received in said channels and removable clampable fastening means in said support members for securing said edges in said channels, wherein said longitudinal channels extend in a vertical direction in the erect position of a vertical support,



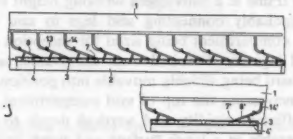
with said removable clampable fastening means serving to fix the edge portions of the vertical panels that are received in a channel in a said support member, so that a said received vertical panel is independently fixed in a channel of a single vertical support.

4,231,553

APPARATUS FOR COOLING RAPIDLY MOVING ROLLED MATERIAL

Hugo Beerens, Meerbusch; Hugo Feldmann, Alsdorf-Warden, and Claus G. Schlanzke, Ratingen-Eckamp, all of Fed. Rep. of Germany, assignors to Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 891,005, Mar. 28, 1978, abandoned.
This application Mar. 13, 1979, Ser. No. 20,215
Claims priority, application Fed. Rep. of Germany, Mar. 30, 1977, 2714019
Int. Cl.[3] C21D *9/52*
U.S. Cl. 266—113 **5 Claims**



1. Apparatus for cooling hot, rolled material issuing from the rolling mill at high speed, the apparatus having an upstream end and a downstream end, the apparatus comprising a plurality of guide tubes arranged in line and spaced from one another, the tubes having entry ends for admitting the rolled material and exit ends, the tubes defining a path for rolled material through the apparatus, mixing means external to said guide tubes for forming a water/air mixture, and a plurality of cooling medium supply pipes directed into the ends of respective tubes at an acute angle to the path of the rolled material through the apparatus to introduce the water/air mixture into the tubes.

4,231,554

CONTROL VALVE FOR VEHICLE AIR SPRINGS AND THE LIKE

Martin A. Ekonen, Livonia, and James L. Blechschmidt, Plymouth, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Oct. 17, 1978, Ser. No. 952,179
Int. Cl.[3] B60G *11/26*; F16F *3/00, 5/00, 13/00*
U.S. Cl. 267—65 D **6 Claims**

1. A pneumatic control valve for a vehicle suspension system for controlling the flow of compressible fluids to and from an air suspension spring comprising;

a cylinder with a first, second and third ports therethrough spaced intervally along the cylinder wherein said ports enter the sidewall of said cylinder;

said first port operably connected to a supply of compressible fluid;

said second port operably connected to an air suspension spring;

said third port being in fluid communication with the exteriof of said cylinder;

a piston slidably mounted in the cylinder in abutting relationship with the interior of the cylinder;

a piston rod rigidly connected to said piston and extending through the bottom end of said cylinder;

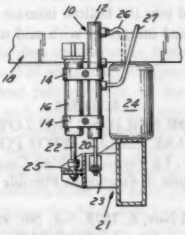
said second port is at the top portion of the cylinder with the first and third ports positioned below said second port;

said piston having a passage therethrough;

said piston moveable to a first position such that said first port is in communication with said second port such that compressible fluid passes from said first port through said second port to said air spring and said piston seals the side of said cylinder sealing the third port from the said first and second ports;

said piston moveable to a second position such that said piston seals the sides of said cylinder sealing all three ports from fluid communication with each other;

said piston moveable to a third position such that said third port is in fluid communication with said second port such



that compressible fluid passes from the air spring through the second port and through the third port and said piston seals the sides of the cylinder sealing said first port from the second and third ports;

said passage through the piston fluidically connecting the second port with one of the first and third ports when said piston is in one of said respective first and third positions;

the air spring being operably connected to the piston rod and cylinder such that the compressible fluids flowing in and out of said air spring control the position of said piston in said cylinder;

the fluid which flows into the second port when the piston is in its first position moving the piston toward said second position and said fluid which flows out of the second port through the cylinder and through the third port when the piston is in its third position moving the piston towards said second position;

the piston having sealing means mounted on the sidewalls thereof for sealing the ports when the piston is laterally aligned therewith;

said passage through said piston having a first outlet at the top surface of said piston with said outlet in fluid communication with said second port and said second outlet aligned with one of the first and third ports when the piston is one of its first and third positions, respectively, such that said compressible fluid flows through the passage between said second port and one of the first and third ports, the other of the first and third ports being positioned above said piston and in fluid communication

with the second port when the piston is in the other of its third and first positions respectively.

4,231,555

BAR-SHAPED TORSION SPRING

Tsutomu Saito, Matsudo, Japan, assignor to Horikiri Spring Manufacturing Co., Ltd., Yachiyo, Japan

Filed Jan. 18, 1979, Ser. No. 4,579
Claims priority, application Japan, Jun. 12, 1978, 53/80213[U]; Aug. 18, 1978, 53/113364[U]
Int. Cl.³ F16F 1/14
U.S. Cl. 267—154 7 Claims

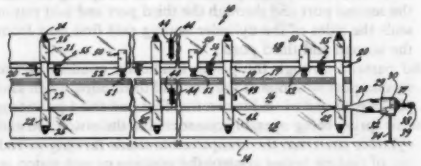
4. A bar-shaped torsion spring, such as a torsion bar, comprising an elongate main body having a hollow interior and a linking means for linking the main body to a body to be sprung, said linking means having a column-shaped leg portions and a linking head portion, said linking means being separately formed from said main body and said column-shaped leg portion being inserted into the hollow interior of each end of said main body and fixed integrally with said main body.

4,231,556

APPARATUS FOR HOLDING HOLLOW WALL PANELS WHILE THEY ARE FILLED WITH FOAMED PLASTIC

George R. Heffner, La Verne, and Max Casutt, San Diego, both of Calif., assignors to Grumman Flexible Corporation, Delaware, Ohio

Filed Nov. 6, 1978, Ser. No. 958,158
Int. Cl.³ B23Q 3/06
U.S. Cl. 269—22 11 Claims



1. Apparatus for holding hollow wall panels while they are filled with foamed plastic comprising:

a base having a top pressure surface,

first platen means having a top pressure surface and a bottom pressure surface, said first platen means being positioned above said base,

second platen means having a bottom pressure surface, a plurality of longitudinally spaced roller support brackets extending downwardly from the bottom of said second platen means for supporting the hollow wall panels,

means for supporting said second platen means above said first platen means,

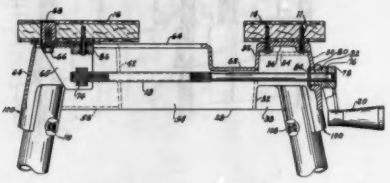
inflatable means positioned between the top pressure surface of said base and the bottom pressure surface of said first platen means for lifting said first platen means upwardly when a fluid under pressure is released into said inflatable means.

4,231,557

PORTABLE WORK BENCH

Donald L. Blachly, Excelsior Township, Sauk County, Wis., and Daniel A. Terpstra, Kirkwood, Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Feb. 21, 1979, Ser. No. 13,208
Int. Cl.³ B25B 1/10
U.S. Cl. 269—139 9 Claims



1. A portable work table and work holding device comprising a horizontally arranged, elongated, rectangular frame consisting of rigidly connected longitudinal and transverse frame members, one of said longitudinal frame members having horizontally spaced vertical side walls, a horizontal bottom wall and vertical end walls forming a longitudinally extending elongated compartment in said frame member open at the top for storage, a pair of boards coextending longitudinally on the upper surface of said frame, one of said boards extending along one longitudinal side of said frame and being fixed thereto, the other of said boards being slidably movable laterally toward and away from said fixed board, and screw-operated means for moving said slidably movable board toward and away from said fixed board, a socket formed at each corner of said frame receiving the upper portions of legs having such length as to space said frame at a convenient working height from a floor, means detachably connecting said legs to said frame, said elongated compartment being sized for reception of said legs when said legs are detached from said frame, said laterally slidable board being slidably movable into positions for covering and uncovering the top of said compartment, said frame having sufficient rigidity and vertical depth to render the device operable as a work surface and work holding means when said detachable legs are removed and said frame is placed directly upon a supporting surface.

4,231,558

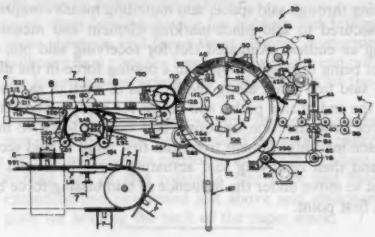
APPARATUS FOR ACCUMULATING ARTICLES SUCH AS BAGS

John S. Aterianus, and Donald C. Crawford, both of Green Bay, Wis., assignors to FMC Corporation, San Jose, Calif.

Filed May 8, 1978, Ser. No. 904,133
Int. Cl.² B65H 39/08
U.S. Cl. 270—60 26 Claims

1. An article accumulating mechanism comprising means for continuously moving a row of equally spaced articles along a first predetermined path, means defining at least one rotatable article collecting drum, means defining at least one article clamping unit on said drum, drive means for rotating said drum and also for cyclically moving said drum bodily along a second predetermined path in timed relation with the movement of the articles for moving said clamping unit into several different positions along said first path to grip said spaced articles, means for actuating said clamping unit for gripping an article each time said clamping unit moves into position to grip an article from said first path and for collecting a plurality of

gripped articles while said rotating drum moves through one cycle along said second path, and means for discharging the



collected group of articles from said one clamping unit while moving said collecting drum along said second path.

4,231,559

FOLDING JAW CYLINDER

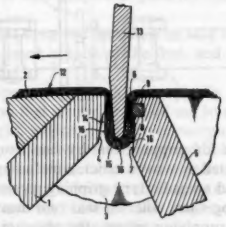
Otto T. Weschenfelder, Wurzburg, and Horst B. Michalik, Hochberg, both of Fed. Rep. of Germany, assignors to Koenig & Bauer Aktiengesellschaft, Wurzburg, Fed. Rep. of Germany

Filed Oct. 6, 1978, Ser. No. 949,184

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1977, 2745359

Int. Cl.³ B65H *45/16*

U.S. Cl. 493—426 **5 Claims**



1. A folding jaw cylinder for a folding mechanism in a web-fed rotary printing machine, said folding jaw cylinder including a fixed front folding edge extending axially along a surface portion of said cylinder and having a first recess and a spaced, cooperating movable folding jaw, said folding jaw having a folding surface adjacent the surface of said cylinder and extending radially inwardly toward the center of said cylinder and having a second inner recess, said folding edge and folding jaw cooperating to form a folding gap with said first and second inner recesses cooperating to form a folding slot into which a portion of a collated stack of sheets may be forced by a folding blade to form a fold in said sheets, said fold in said sheets having a bulge portion extending into said folding slot, said folding jaw being movable toward said folding edge to contact said fold after said fold has been formed, said folding blade remaining in said fold during said movement of said folding jaw toward said folding edge, said folding jaw having a resilient friction increasing means having a coefficient of friction exceeding 0.18, said resilient friction increasing means projecting out of a notch in said folding surface and extending into said folding gap from said folding surface to press against said fold in said sheets radially outwardly from said bulge portion of said fold in said folding slot whereby said fold will be retained in said folding slot as said folding blade is moved out of contact with said sheets.

4,231,560

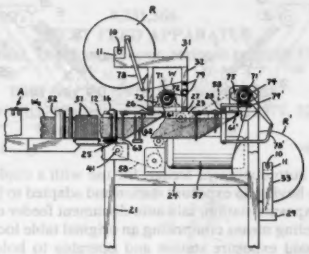
TENSION CONTROLLED APPARATUS FOR FEEDING WEB MATERIAL

Roger H. Stohlquist, and Leo Strombeck, both of Rockford, Ill., assignors to Anderson Bros. Mfg. Co., Rockford, Ill.

Filed Jul. 28, 1978, Ser. No. 929,168

Int. Cl.³ B65H *45/22*

U.S. Cl. 493—29 **8 Claims**



1. A tension controlled apparatus for feeding a web of material from a supply roll to processing equipment of the type that exerts an intermittent pulling force on the web to intermittently advance the web through the processing equipment, the apparatus including means for supporting a supply roll of web material for unwinding rotation, a first web feed roller mounted for axial rotation, a first web guide means for guiding the web after it unwinds from the supply roll to cause it to wrap part way around the first web feed roller, means for driving the first web feed roller in continuous fashion in a direction to feed the web passing thereover from the supply roll, the first web feed roller having a smooth low friction web engaging surface operative to feed the web passing thereover when the tension on the web exceeds a minimum value and to slip relative to the web when the web tension decreases below the minimum value, a drive wheel mounted for axial rotation and drive means for driving said drive wheel in continuous fashion, a driven wheel mounted for rotation about an axis parallel to said drive wheel and for shifting movement bodily along a path toward and away from said drive wheel, a second web feed roller connected coaxially to said driven wheel for rotation thereby, second web guide means for guiding the web of material to cause it to wrap part way around the second web feed roller as it passes from the first web feed roller to the processing equipment and exit from the second web feed roller in an exciting direction having a substantial component along said path and in a direction to shift the driven wheel along said path and into driving engagement with the drive wheel when tension is applied by the processing equipment on the web material exiting from the second web feed roller, the second web feed roller having a high friction web engaging surface operative when its driven wheel is in driving engagement with the drive wheel to feed the web exiting from the first web feed roller toward the processing equipment, said second web guide means including web folding means engaging the web at a location between the first web feed roller and the second web feed roller for longitudinally folding the web of material to form a folded web, said folded web being guided around said second web feed roller.

4,231,561
AUTO DOCUMENT FEEDER FOR USE WITH DUPLEX COPYING MACHINE

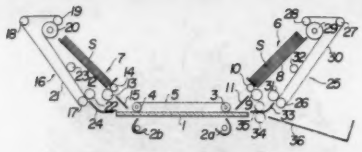
Tamaki Kaneko, Fujisawa; Seiichi Miyakawa, Nagareyama; Toyokazu Satomi, Yokohama; Yutaka Koizumi, Kawasaki; Isao Nakamura, Tokyo, and Yasuhiro Tabata, Kawasaki, all of Japan, assignors to Ricoh Company, Ltd., Japan

Filed Feb. 6, 1978, Ser. No. 875,537

Claims priority, application Japan, Feb. 10, 1977, 52-13843; Feb. 28, 1977, 52-21283; Mar. 25, 1977, 52-33772

Int. Cl.[2] B65H *1/06, 5/02, 29/00*

U.S. Cl. 271—3.1 **12 Claims**



3. An auto document feeder, for use with a duplex copying machine having an exposure station and adapted to be mounted on the exposure station, said auto document feeder comprising: sheet feeding means comprising an original table located at one side of said exposure station and operable to hold therein a plurality of sheet originals to be copied and to feed the sheet originals therefrom individually in predetermined sequence and orientation to said exposure station; platen belt means mounted on said exposure station and operable to transport a sheet original across said exposure station and to maintain each sheet original in close contact with said exposure station during exposure of the sheet original, said platen belt means being reversible to effect copying of one side of each sheet original during a forward movement of said platen belt means and a copying of the other side of the sheet original during a backward movement of said platen belt means; sheet reversing means operable to receive sheet originals from said exposure station and to invert the received sheet originals, said sheet reversing means comprising a primary sheet reversing apparatus and a secondary sheet reversing apparatus, said primary sheet reversing apparatus feeding sheet originals to said original table and said secondary sheet reversing apparatus feeding sheet originals to said exposure station of copying said other sides of said sheet originals; and sheet transport means operable to transport said sheet originals individually from said sheet reversing means to said sheet feeding means.

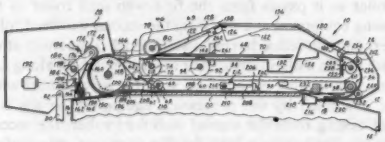
4,231,562
RECIRCULATING DOCUMENT FEEDER

Tatsu Hori, Los Altos, Calif., assignor to Savin Corporation, Valhalla, N.Y.

Filed Mar. 9, 1978, Ser. No. 884,999

Int. Cl.[3] B65H *5/22*

U.S. Cl. 271—3.1 **18 Claims**



1. In a sheet feeder in which sheets are separated from one side of a stack and returned to the other side of the stack, said feeder having a place-marking element and means for automatically setting said element against the sheet on the other side of said stack, the improvement wherein said automatic setting means comprises means for mounting said element for movement along either of two paths between a first point on said one side of said stack and a second point on said other side of said stack, one of said paths extending through the space occupied by said stack and the other of said paths being a return path not extending through said space, said mounting means comprising a pin secured to said place-marking element and means for forming an endless elongated slot for receiving said pin, said element being normally subject to a biasing force in the direction of said first point along the lengths of each of said paths and at the end of said paths, and means for applying an actuating force in a direction opposing said biasing force to move said place-marking element from said first point to said second point and then removing said actuating force to permit said element to move under the influence of said biasing force back to said first point.

4,231,563
DEVICE FOR GRIPPING AND DISPLACING KNITTED OR WOVEN ARTICLES

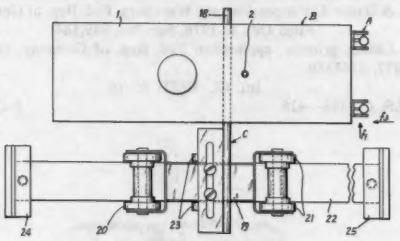
Frantz M. Boucraut, Troyes, France, assignor to Valton S.A., Troyes, France

Filed Oct. 27, 1978, Ser. No. 955,413

Claims priority, application France, Nov. 4, 1977, 77 33192; Oct. 11, 1978, 78 28994

Int. Cl.[3] B65H *3/22*

U.S. Cl. 271—18.3 **11 Claims**



1. A device for gripping one by one from a pile and for displacing knitted or woven articles, including a vacuum gripping means and a needle type gripping means acting together functionally together, wherein said two means are combined with a third, supplying means, the vacuum gripping means having an adherence surface with a first extremity and a second, opposite, extremity, said adherence surface having at least the same area as the said articles, the needle gripping means being placed in the vicinity of the first extremity of the vacuum gripping means so that the vacuum and needle gripping means may be displaced together as they grip one of said knitted or woven articles and the supplying means being placed in the vicinity of the pile of articles substantially at the height of the first article in said pile, at least one of the vacuum gripping means and the supplying means being mounted so as to cause relative movement therebetween, said movement commencing by said two means approaching one another when the needle type gripping means has seized and raised the edge close to the supplying means of the first article lying on the pile of articles.

4,231,564
PAPER SHEET HOLDING DEVICE FOR PAPER SHEET COUNTER

Tuyoshi Miyagawa, and Junichi Arikawa, both of Tokyo, Japan, assignors to Laurel Bank Machine Co., Ltd., Tokyo, Japan

Filed Mar. 7, 1979, Ser. No. 18,273

Claims priority, application Japan, Mar. 15, 1978, 53-33009

Int. Cl.[3] B65H *1/02, 1/26*

U.S. Cl. 271—95 **9 Claims**

1. In a paper sheet counter including a rotary suction cylinder in communication with a vacuum source, and a plurality of

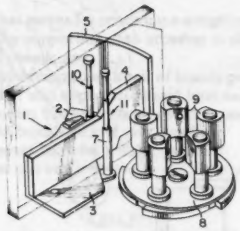
suction heads carried on said rotary suction cylinder and made rotatable for sucking paper sheets one by one so as to deflect and individualize for counting the same when the same are brought close to said suction cylinder,

a paper sheet holding device for holding and bringing the paper sheets to said paper sheet counter, comprising:

a stationary base plate for bearing thereon one end portion of the lower longer side of an upright stack of the paper sheets;

a rotatable base plate for carrying thereon the other end portion of the lower longer side of the upright paper stack;

an upright holder plate carried in an upright position on the trailing side of said rotatable base plate and having its extending end positioned just above said stationary base plate for holding the back of the paper stack;



a first upright keep rod mounted on the outer wall of said holder plate;

a holder arm extending close to said paper sheet counter and made coactive with said holder plate for holding the paper sheets;

a second upright keep rod mounted on said holder arm;

a receptable formed in each of the first- and second-named keep rods; and

a telescopic pipe rod received telescopically in each of the receptacles so that it may be pulled out to and retained at a preset height, whereby the two telescopic pipe rods can be vertically extended to be capable of holding the paper sheets between the two telescopic pipe rods and thereby preventing the paper sheets from hanging downward even if the latter are too wide for the heights of said holder plate and said holder arm as they are.

4,231,565

PAPER FEED DEVICE

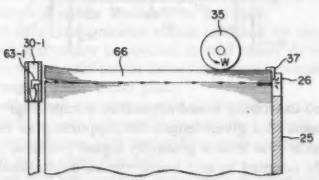
Junji Ichikawa, Kawasaki; Yuji Takahashi, Tokyo, and Jun Saito, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 8, 1977, Ser. No. 849,628

Claims priority, application Japan, Nov. 12, 1976, 51-135982; Nov. 12, 1976, 51-135983; Nov. 12, 1976, 51-135984; Nov. 12, 1976, 51-135985; Nov. 12, 1976, 51-135986

Int. Cl.[2] B65H *3/48, 3/56*

U.S. Cl. 271—105 **1 Claim**



1. A paper feed device comprising:

means for storing a stack of paper leaves to be fed;

means, located above said storage means, for feeding the topmost paper leaf on the stack in a forward direction;

means, located at the front end of said storage means, for separating the topmost paper leaf from the stack to allow said feeding means to feed the topmost paper leaf only;

blowing means for applying pressurized air from adjacent the rear end of the stack in the forward direction at a position remote from the topmost leaf to render the leaves easily separable from adjacent leaves; and

control means for actuating said blowing means at a predetermined time after said feeding means starts to feed the topmost leaf from said stack.

4,231,566

SHEET FEED APPARATUS

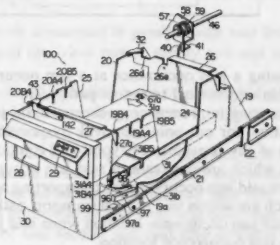
Minoru Suzuki, Yokohama, Japan, assignor to Ricoh Company, Ltd., Japan

Filed Nov. 30, 1978, Ser. No. 964,888

Claims priority, application Japan, Nov. 30, 1977, 52-144479

Int. Cl.[3] B65H *3/06, 1/18*

U.S. Cl. 271—117 **18 Claims**



1. A sheet feed apparatus for use with a copying apparatus comprising a sheet feed base mounted on the apparatus for movement between an inoperative sheet replenishing position and an operative sheet feeding position, support means for supporting a stack of recording sheets of different sizes on said feed base, sheet feeding means disposed above a stack of recording sheets disposed on said sheet support means, said feeding means including a drive shaft, a first feed roller means drivingly connected to said drive shaft, and a second feed roller means drivingly connected to said drive shaft, said second feed roller means being mounted for axial movement along said drive shaft, and means for shifting said second roller means axially of said drive shaft as said sheet feed base is moved between its operative and inoperative position so that said first and second roller means are optimately spaced along said drive shaft in accordance to the size of the recording sheets supported on said support means when said sheet feed base is disposed in its operative position.

4,231,567

METHOD AND APPARATUS FOR CLEARING JAMS IN COPIERS

Richard T. Ziehm, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 1, 1978, Ser. No. 965,666

Int. Cl.[3] B65H *7/06, 43/04*

U.S. Cl. 271—259 **6 Claims**

1. In a copier having means for making copies of document images including a copy input and a copy output and an in-process copy sheet normal transport path therebetween, the improved method for clearing copy sheet jams within the transport path comprising the steps of:

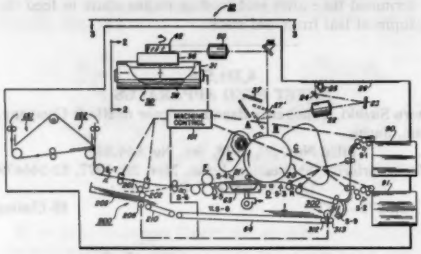
(a) providing copy sheet jam sensing and copy sheet cluster areas within said normal transport path actuable in response to copy sheet jams,

(b) sensing a jam occurrence at a jam area,

(c) clustering in-process copy sheets at a cluster area within said normal transport path upstream of a jam sensing area in response to a downstream jam by continuing the operation of at least part of said transport path to said cluster area; and

(d) removing the copy sheets at the jam area and the copy sheets clustered at said cluster area.

4. A method for clearing jams in a copier with a normal transport path for in-process copy sheets comprising the steps of:



(a) sensing a jam occurrence at a jam occurrence location within said normal transport path; and

(b) clustering in-process copy sheets at said jam occurrence location, for one-point removal, by preventing the transport of any copy sheets beyond said jam occurrence location which are upstream of said jam occurrence location when said jam occurs and by transporting said copy sheets which are within said normal transport path and upstream of said jam occurrence location when said jam occurs into said jam occurrence location.

4,231,568

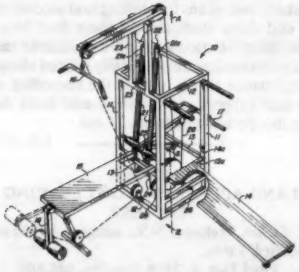
EXERCISE MACHINE WITH SPRING-CAM ARRANGEMENT FOR EQUALIZING THE FORCE REQUIRED THROUGH THE EXERCISE STROKE

Robert Q. Riley, 6835 E. Sheena Dr., Scottsdale, Ariz. 85254, and David L. Carey, 13627 N. 18th Dr., Phoenix, Ariz. 85029

Filed Jan. 29, 1979, Ser. No. 7,427

Int. Cl.³ A63B *21/04*

U.S. Cl. 272—136 **1 Claim**



1. In an exercise machine which includes

a frame,

a force-applying member carried by and movable with respect to said frame through an exercise stroke in response to physical force exerted thereon by a user, and

spring means carried by said frame to resist the physical force applied by the user through said exercise stroke,

the improvement comprising:

force equalizing means, operatively associated with said spring means and said force-applying member, for equalizing the physical force required to move said force-applying member throughout said exercise stroke against the increased force required to elongate the spring means when said force-applying member is moved in the direction to elongate the spring means.

4,231,569

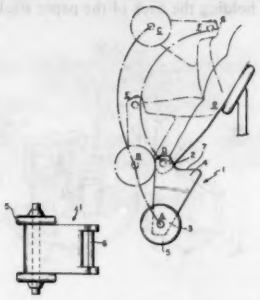
EXERCISING DEVICE

Scott M. Rae, 317 Adahi Rd., S. E., Vienna, Va. 22180

Filed Jun. 2, 1978, Ser. No. 911,903

Int. Cl.³ A63B *11/04*

U.S. Cl. 272—122 **12 Claims**



1. An exercising device which comprises an elongated frame member having a longitudinal axis and having two end portions and an intermediate portion disposed therebetween, one of said portions including means for receiving a weight member, and a handle means rotatably attached to the other of said end portions, for rotation about an axis transverse to said longitudinal frame axis, said intermediate portion of said frame member including means shaped to contain an arm-engaging surface adjacent said handle means.

4,231,570

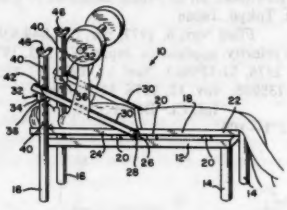
SAFETIED EXERCISING BOARD APPARATUS, AND METHOD OF SAFETYING EXERCISING BOARD APPARATUS

Robert V. Reis, 5 Marguerite La., Towaco, N.J. 07082

Filed May 25, 1978, Ser. No. 909,203

Int. Cl.³ A63B *00/00*

U.S. Cl. 272—123 **3 Claims**



1. Safetied exercising board apparatus, comprising:

board means of a given length for supporting an exerciser thereupon in at least a generally supine position;

an upright coupled to said board means, substantially adjacent one end of said board means; and

elongate means, having one end thereof fixed to said board means, at a location intermediate the length of said board means, the opposite end of said elongate means being

engageable with said upright, with a freely-displaceable, contacting engagement, in a plane elevated from said board means, for receiving thereupon a falling or otherwise uncontrolled weight-crossbar, to prevent such crossbar from freely impacting upon an exerciser supine on said board means;

wherein

said elongate means comprises means for deflecting such a falling or uncontrolled weight-crossbar away from said upright and toward said intermediate location;

said elongate and deflecting means further comprises a linear safety bar pivotably coupled at one of opposite ends thereof to said board means at said intermediate location; and further including

rest stop means coupled to said upright for receiving the other of said opposite ends of said safety bar thereupon; wherein

said upright has means for receiving a weight-crossbar thereupon and for supporting such crossbar in elevation above said board means; and

said board means comprises a pair of boards pivotably joined in traverse of said apparatus at said intermediate location;

said board means further comprises hinge means pivotably joining said boards of said pair together;

said hinge means includes a hinge pin; and

said safety bar one end is pivotably coupled to said hinge pin.

4,231,571

PORTABLE OBSTACLE TOY

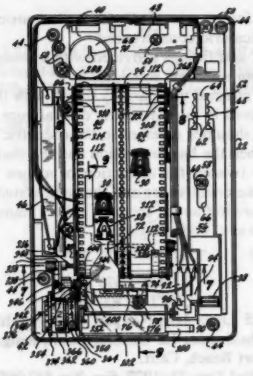
Hiroyuki Watanabe, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan

Filed Dec. 21, 1978, Ser. No. 971,646

Claims priority, application Japan, Dec. 28, 1977, 52-157850

Int. Cl.³ A63F 9/14

U.S. Cl. 273—1 E **18 Claims**



13. A portable electrical mechanical toy including:

a base;

an electrical power supply mounted on said base;

an electrical motor mounted on said base;

motor drive transmission means mounted on said base, said electrical motor connected to said motor drive transmission means, said motor drive transmission means including a magnetizable metal plate;

an endless belt support means connected to said base;

two endless belts independently mounted on said endless belt support means, said two endless belts including a left side belt and a right side belt;

said left side belt and said right side belt, each independently connected to said motor drive transmission means and each independently driven in an orbit around said endless belt support means;

said left side endless belt and said right side endless belt each including a top surface and a bottom surface, at least one obstacle means on the top surface of said left side belt and said right side belt;

an object member mounting means including an object member, said object member mounting means slidably mounted on said base such that said object member lies proximal to the top surfaces of said left and said right side belts, and slides transversely to the direction of the orbits of said endless belts such that said object member alternately is positioned over the top surface of said left and said right side endless belts and includes at least one coplaner position between said object member and each of said obstacle means on both said left and said right side belts;

each of said left and said right side endless belts including an opening corresponding to each of said obstacles on said belts and said openings extending between said top surface and said bottom surface of said endless belts;

a start-reset switch;

a first circuit including said electrical power supply, said start-reset switch and said electrical motor connected in series;

a second circuit connected in parallel with said first circuit between said electrical power supply and said start-reset switch;

said second circuit including a sensor switch and a solenoid;

said sensor switch including a first, a second, a third, a fourth, a fifth and a sixth contact;

said sensor switch including said second and said fifth contacts connected in series, said third and said sixth contacts connected in series, said second and said fifth contacts connected in parallel to said third and said sixth contacts, and each of said second and said fifth contacts and said third and said sixth contacts connected in series with said first and said fourth contacts, and said first and said fourth contacts connected in series with said reset switch and said solenoid switch;

said first contact positioned proximal to one of said bottom or said top surfaces of both said left and said right side endless belts, said second contact positioned proximal to the other of said top or said bottom surface of said left side endless belt, said third contact means positioned proximal to the other of said top or bottom surface of said right side endless belt, said second contact contacting said first contact through said opening in said surfaces of said left side endless belt when said object member is coplanar with said obstacle means on said left side endless belt, said third contact contacting said first contact through said opening in said surfaces of said right side endless belt when said object member is coplaner with said obstacle means on said right side endless belt;

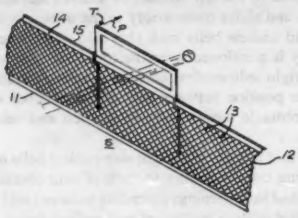
said fourth contact connected to said object member mounting means, said fifth and said sixth contacts positioned such that said fourth contact contacts said fifth contact when said object member is positioned over said left side endless belt and said fourth contact contacts said sixth contact when said object member is positioned over said right side endless belt;

said solenoid magnetically connected to said magnetizable metal plate of said motor drive transmission means wherein when said second circuit is closed said metal plate is magnetically moved by said solenoid disconnecting said connection between said motor drive transmission means and each of said endless belts such that said endless belts cease to be driven around said endless belt support means and when said reset switch is activated said second circuit is opened and said solenoid relaxes its magnetic effect on said magnetizable metal plate reconnecting said connection between said motor drive transmission means and each of said endless belts.

4,231,572
TENNIS BALL TARGET

William S. Thornton, 204 Ella St., Lafayette, La. 70506

Filed Sep. 29, 1978, Ser. No. 947,074
Int. Cl.[3] A63B 61/00
U.S. Cl. 273—29 A 6 Claims



1. A tennis ball target for a tennis net arranged in an installed playing position comprising, in combination, a target frame having an opening defining a target area for the passage of a tennis ball driven by a tennis player, support means for detachably mounting said frame on the tennis net in an upright, operative position with said frame extending above the upper edge of said net substantially in coplanar relationship therewith to present said opening to a player, said support means comprises a pair of downwardly depending posts arranged in laterally, spaced-apart parallel relationship, means on the upper ends of said posts for engaging the upper edge of the tennis net, means on the upper ends of said posts for mounting said frame on said posts, said posts being adapted to be interwoven with the meshes of the net in vertically extending positions with said net engaging means in supporting engagement with the upper edge of the net to detachably support said frame in said operative position, said means for mounting said frame on said posts include a spring on each of said posts for yieldingly urging said frame into said operative position whereby said frame is adapted to move yieldingly from said operative position when struck by a driven tennis ball and, said means for engaging the upper edge of the tennis net include a hook portion on the upper end of each of said posts for hooking engagement with the net upper edge.

4,231,573
BOWLING LANE AND SURFACE

Peter B. Kelly, Coshocton, Ohio, assignor to General Electric Company, Worthington, Ohio

Division of Ser. No. 901,791, May 1, 1978, abandoned, which is a continuation of Ser. No. 506,069, Sep. 16, 1974, abandoned.
This application Jul. 21, 1978, Ser. No. 926,604
Int. Cl.[2] A63D 1/04
U.S. Cl. 273—51 26 Claims

1. A bowling lane having a surface characterized by a falling ball impact resistance of at least 60 inches, a coefficient of friction of about 0.18 and a Taber abrasion resistance of at least about 500 cycles, said bowling lane comprising a substrate selected from the group consisting of natural wood, consolidated wood fibers, plywood, flakeboard, chipboard and hardboard, and at least one decorative plastic laminate sheet secured to the surface of said substrate, said plastic laminate sheet comprising a plurality of thermosetting resin impregnated fibrous core sheets, a resin impregnated decorative fibrous print sheet, and an overlying resin containing protective layer.

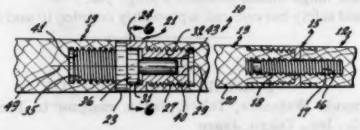
12. A decorative plastic laminate sheet of a length, thickness and a width for securing to a substrate selected from the group consisting of natural wood, consolidated wood fibers, plywood, flakeboard, chipboard, and hardboard to form therewith all or part of a bowling lane having a surface characterized by a falling ball impact resistance of at least 60 inches, a coefficient of friction of about 0.18 and a Taber abrasion resistance of at least about 500 cycles, said plastic laminate sheet comprising a plurality of thermosetting resin impregnated fibrous core sheets, a resin impregnated decorative fibrous print sheet, and an overlying resin containing protective layer.

18. The method of producing a bowling lane having a surface characterized by a falling ball impact resistance of at least 60 inches, a coefficient of friction of about 0.18 and a Taber abrasion resistance of at least about 500 cycles comprising consolidating a plurality of thermosetting resin impregnated core sheets, a resin impregnated decorative fibrous print sheet, and an overlying resin-containing protective layer under heat and pressure to produce a unitary decorative plastic laminate sheet, and securing at least one such plastic laminate sheet to a substrate selected from the group consisting of natural wood, consolidated wood fibers, plywood, flakeboard, chipboard and hardboard to produce the desired bowling lane.

4,231,574
BILLIARD CUE HAVING A QUICK CONNECTOR FOR THE HANDLE PORTION THEREOF

William J. Williams, 11016 Mohawk, Apple Valley, Calif. 92307

Filed Nov. 6, 1978, Ser. No. 957,838
Int. Cl.[2] A63D 15/08
U.S. Cl. 273—68 6 Claims



1. A billiard cue comprising:
a handle portion;
a shaft portion; and
fittings carried on the ends of the handle portion and shaft portion;
one of said fittings provided with a concentric central bore and an eccentric counterbore;
the other of said fittings provided with a concentric central stud and an eccentric shoulder;
said fittings adapted to be axially mated with the concentric stud received in the concentric central bore and with the eccentric shoulder received in the eccentric counterbore;
whereby when the handle portion and the shaft portion are relatively twisted for a fraction of a turn the shoulder engages the counterbore and the central stud engages the central bore to thereby securely axially clamp said handle portion to said shaft portion.

4,231,575
RACKET STRINGING

Mers Kutt, 105 Linda Isle, Newport Beach, Calif. 92660, and Bernard Osbaldeston, La Canada, Calif., assignors to Mers Kutt, Newport Beach, Calif.

Filed Dec. 23, 1977, Ser. No. 863,999
Int. Cl.[3] A63B 51/00, 51/08
U.S. Cl. 273—73 D 11 Claims

1. A racket having an improved stringing network, said racket comprising:
a frame enclosing an annular opening and having a handle extending longitudinally from the bottom thereof;
a first plurality of generally aligned main string crossings traversing the frame from top to bottom thereof in a generally longitudinal direction and consisting of all of the main string crossings of the racket, the said main string crossings having relatively close spacing to each other at the top of the frame and continuously flaring away from each other with increasing spacing therebetween as they traverse across the frame opening to the bottom of the frame;
a second plurality of generally aligned string crossings traversing across the frame opening from one portion of the

frame to an oppositely disposed portion of the frame, making large angles near 90 degrees with the first plurality

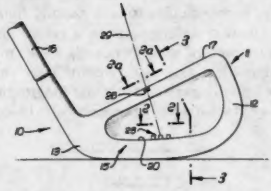
of string crossings, and being woven through the first plurality of string crossings.

4,231,576

GOLF CLUB HEAD ALIGNMENT APPARATUS

Sonnie J. Perkins, 1437 180th N.E., Bellevue, Wash. 98008

Filed Feb. 21, 1979, Ser. No. 13,028
Int. Cl.³ A63B *69/36*
U.S. Cl. 273—183 D **5 Claims**



1. In combination with a golf club having a head defining a toe, heel, upright front face and rear side, the improvement combination comprising

(a) multiple indicia on a lower portion of the head rear side, said indicia presented upwardly for viewing by the player, and

(b) an alignment marker on the club above the level of said indicia and adapted to be brought into visual alignment with a selected one of said indicia in response to adjustment shifting of the player relative to the club head,

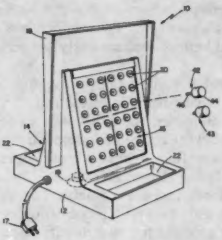
(c) the indicia on said lower portion of the head rear side being discrete and separate from one another, and also spaced apart both in a first direction extending generally between the toe and heel, and also in a second and forward direction extending generally toward the front face, different of said indicia having at least two different configurations.

4,231,577

ELECTRICAL GAME APPARATUS USING FOLD SWITCH MATRICES

Wendl Thomas, 55 Dinsmore Ave., Framingham, Mass. 01701; Holly T. Doyle, and Robert O. Doyle, both of 77 Huron Ave., Cambridge, Mass. 02138

Filed Feb. 14, 1978, Ser. No. 877,797
Int. Cl.² A63F *3/00*
U.S. Cl. 273—238 **1 Claim**



1. Game apparatus, comprising

an enclosure including first and second boards, one for each of two players, and shield means maintaining each board visible to its player and invisible to the other player,

said boards being positioned with at least one edge adjacent to a corresponding edge on the other board,

each board being positioned in a substantially vertical plane,

each board providing a plurality of apertures extending therethrough defining an aperture matrix array, each aperture in a said aperture matrix array corresponding with a single aperture in the other said aperture matrix array,

said enclosure including sheet support structure disposed adjacent and inwardly of each said board and generally parallel therewith,

each said board providing on its inward surface an alignment boss extending inwardly toward said sheet support structure,

a flexible sheet member carried in said enclosure and carrying electrical circuit means on a single surface thereof, said sheet being folded to define a plurality of regions comprising,

first and second fixed contact carrying regions,

first and second movable contact carrying regions, and

first and second spacing regions free of circuit elements and providing contact apertures,

each said region having an alignment slot therein,

said first fixed and movable contact carrying regions being disposed adjacent one another with said first spacing regions therebetween, said movable contact elements being engageable with said fixed contact elements through said contact apertures, said first spacing region normally maintaining said movable and fixed contacts spaced apart, said alignment slots of said first fixed and movable contact carrying regions and said first spacing region being aligned with one another and cooperating with a said alignment boss positively to position said fixed and movable contact elements with respect to each other and to said contact apertures, and positively to position said three first regions with respect to said first board and its aperture matrix array,

said sheet member extending across the junction between the said adjacent edges of said boards such that, said second fixed contacts, movable contacts and spacing regions are disposed and aligned with respect to one another and to said second board in the same relationship as said first fixed and movable contact regions and spacing region are disposed and aligned with respect to said first board,

said electrical circuit and contact elements carried on said sheet surface defining electrical circuit means including a plurality of switches, said plurality of switches defining two switch matrix arrays, each corresponding to a said aperture matrix array of one of said boards, each said switch being disposed adjacent one of said apertures,

power source connecting means for connecting a power source to said electrical circuit means,

signal means connected to said electrical circuit means, responsive to a closed circuit position between said signal means and said power source connecting means for producing a signal during the continuance of said condition, said signal being simultaneously perceptible to both players,

said electrical circuit means providing a conductor connected between one side of each of every two said corresponding switches, the other side of said corresponding switches being connected respectively to said power source connecting means and said signal means,

a plurality of plug pieces each removably insertable in any of said apertures and maintainable therein by inference fit therewith, each said plug piece being formed so that when inserted it actuates the switch corresponding to said aperture and while it remains within said aperture, it maintains said underlying movable contact in engagement with said fixed contact,

the presence of a said plug piece in each of two corresponding said apertures in said aperture matrix arrays providing a continuing closed circuit condition between said power source connecting means and said signal means,

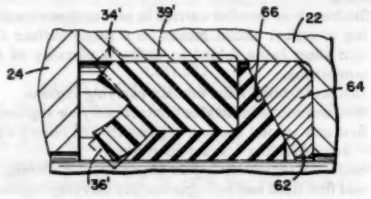
whereby a continuing perceptible signal indicates to both players the presence of a plug piece in each of two corresponding apertures.

4,231,578

SEAL ASSEMBLY

Henry A. Traub, Pacific Palisades, Calif., assignor to W. S. Shamban & Co., Santa Monica, Calif.

Filed Apr. 23, 1979, Ser. No. 32,525
Int. Cl.³ F16J *15/24, 15/32*
U.S. Cl. 277—121 **9 Claims**



1. A seal assembly having a low pressure side and a high pressure side, said seal assembly comprising:

a first annular sealing ring having a substantially L-shaped cross-sectional configuration, the base portion of which has a first end and a second end and defines the low pressure side of said seal assembly, the arm portion of said L-shaped sealing ring extending axially from said first end of said base portion, said arm portion having a first side coplanar with said first end of said base portion and having a second side, the free end of said arm portion tapering to form an acute edge on said first side of said arm portion;

a second annular sealing ring having a substantially Y-shaped cross-sectional configuration, the body portion of which has a first side and a second side, the distance between which is greater than the distance between the second end of said base portion and the second side of said arm portion of said L-shaped annular sealing ring, said second annular sealing ring being seated concentrically upon said first annular sealing ring such that said second side of said body of said second annular sealing ring confronts said second side of said arm portion of said first annular sealing ring;

said second annular sealing ring having two arm portions each of which has an outermost corner, said corners spanning a distance greater than the distance between said first and second end of said base of said first annular sealing ring;

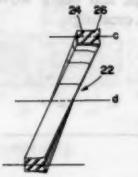
said two arm portions extending toward the high pressure side of said seal assembly, one of said two outermost corners extending just beyond the edge of said arm of said first annular sealing ring whereby substantially all the length of one of said two arms rests upon the tapered portion of the free end of the arm of said first annular sealing ring.

4,231,579

SEALING RING

John B. Scannell, Sandy, Utah, assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Jul. 12, 1978, Ser. No. 923,838
Int. Cl.³ F16J *15/32*
U.S. Cl. 277—205 **11 Claims**



1. A sealing ring of resilient material having a base portion at one end and a sealing portion at the other end that is bifurcated to form radially inner and outer sealing lips, said sealing ring having a free state and a deformed state; in said free state a centerline through a cross section of each of said portions lies in a cone, said base portion has an end surface and radially inner and outer surfaces, said radially inner and outer surfaces are substantially parallel to said centerline, and said end surface is substantially perpendicular to said radially inner and outer surfaces; and in said deformed state a centerline through a cross section of each of said portions is substantially parallel with said longitudinal axis, said radially inner and outer surfaces are substantially parallel with said longitudinal axis, and said end surface is substantially perpendicular to said longitudinal axis.

4,231,580

LOST MOTION TOOL RETAINER

Henri Emonet, 12 rue R.P. Couturier, Montbrison - Loire, France

Filed Aug. 7, 1978, Ser. No. 931,517
Int. Cl.³ B23B *31/02*
U.S. Cl. 279—19.1 **9 Claims**

1. A reciprocating piston operated jack hammer device for breaking concrete utilizing mutually exclusively a latch type and a spring-type shifter, said device comprising:

a one piece housing having one end portion; an opposite end portion housing said piston; and a central bore therethrough;

a sleeve member mounted in the central bore of said one end portion of the housing, said sleeve member having a shoulder abutting said one end portion of the housing, said sleeve member further having an axial passage;

means for mounting said sleeve member to said housing;

a tool member having a shank portion, a working end portion and a flange therebetween, said shank portion being

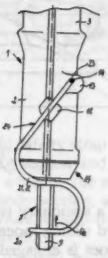
slidably mounted in said axial passage of the sleeve member;

means for interchangeably securing a latch type shifter with a spring type shifter to said housing, said securing means further including:

at least one pitched contact surface on the external surface of said one end portion of the one piece housing:

two spaced lugs located on the external surface of the housing, said lugs having coaxial holes for receiving a spring type shifter, said holes intersecting said central bore of the housing;

means for removably securing a latch type shifter to said sleeve member;



means limiting slidable movement of said tool member to a predetermined position in a direction away from said sleeve member; and

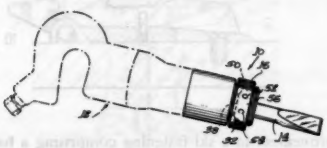
means for mounting said limiting means to said housing so that when said piston strikes said tool member to slidably move said tool member in a direction away from said piston, said limiting means engages said flange of the tool member to prevent said tool member from sliding beyond a predetermined distance from said sleeve member and such that when said tool member slidably moves in a direction towards said piston, said flange of said tool member engages said sleeve member to terminate slidable movement towards said piston.

4,231,581

PNEUMATIC HAMMER WITH TWIST RETAINER

Neil W. Benedict, Evanston, Ill., assignor to Ajax Tool Works, Inc., Franklin Park, Ill.

Filed Oct. 10, 1978, Ser. No. 949,408
Int. Cl.³ B23B *31/22*
U.S. Cl. 279—19.4 **4 Claims**



1. A pneumatic hammer for use with tools having a retainer collar or retaining grooves on a shank of the tool, said pneumatic hammer including:

a barrel, said barrel having a first large diameter portion and a smaller diameter cylindrical portion, a radially extending shoulder wall between said large diameter and smaller cylindrical portions, said barrel having a central bore opening at one end thereof to receive a shank of a tool and a plurality of circumferentially spaced retaining ball sockets in said cylindrical portion;

a plurality of retaining balls each inserted into one of said sockets to project inwardly into the barrel bore;

said sockets having inwardly tapered walls extending toward said bore and opening therein with a dimension smaller than the diameter of said balls in said socket to limit the extent of inward projection of said balls;

an outer retainer sleeve rotatably carried on said cylindrical portion of said barrel, having a plurality of recesses in said retainer sleeve for alignment with said balls at an open position to allow said balls to move radially outward in said sockets to allow insertion or removal of a tool and having a plurality of camming surfaces thereon with each surface being adjacent to a socket for twisting toward a ball to force and hold said ball inwardly at a closed position to retain the shank collar or shank grooves and limit the tool shank to a predetermined outward position;

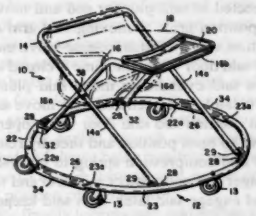
detent means for locking said sleeve in at least said closed position comprising a resilient compressible rod having one end mounted in said shoulder wall and extending longitudinally along said cylindrical portion, a longitudinally extending groove formed in said sleeve for receiving said rod when said sleeve is in said locking position, said rod being compressible and removed from the groove by twisting said sleeve in order to change the position of said sleeve relative to the barrel; and limiting means associated with said sleeve and barrel for limiting the twisting movement of said sleeve relative to said barrel, said limiting means comprising a pin carried by one of said barrel and sleeve, and first and second abutment means carried by the other of said barrel and sleeve, said first abutment means for stopping said pin when said sleeve is in the open position and said second abutment means for stopping said pin when said sleeve is in the closed position.

4,231,582

FOLDABLE ROUND BOUNCER/WALKER

Mark D. Moss, Hollidaysburg, Pa., assignor to Hedstrom Co., Bedford, Pa.

Filed Sep. 11, 1978, Ser. No. 941,242
Int. Cl.³ B62D *7/10*
U.S. Cl. 280—87.02 W **3 Claims**



1. A child's play seat of the type which includes a pair of scissor frames and a seat supported by the scissor frames, the improvement comprising a pair of arcuate base frame sections the opposite ends of which are positioned opposite one another, a pair of coil springs connected to the opposing ends of the two base frame sections to form a base ring and means for pivotally connecting the lower ends of the scissors frames to the base frame sections so that a weight in the seat tends to spread apart the lower ends of the scissor frames thereby spreading apart the base frame sections and tensioning the springs so that the seat is resiliently supported above the ground and wherein said corresponding scissor frames comprise telescoping sections permitting the scissor frames and seat to fold down against the base ring, and means for releasably securing the telescoping sections in their extended positions.

4,231,583

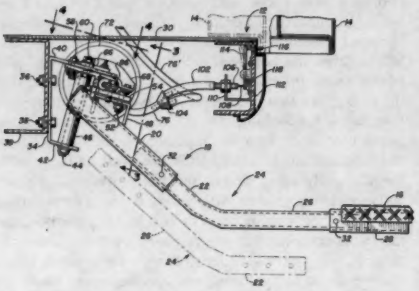
PROJECTABLE STEP FOR VEHICLES

William H. Learn, 402 Frederick Street, Hanover, Pa. 17331

Filed May 31, 1979, Ser. No. 44,085

Int. Cl.³ B60R *3/02*

U.S. Cl. 280—166 **10 Claims**



1. A step assembly for a vehicle having a chassis frame and a door opening outward from one wall of the body of the vehicle and means to develop a source of vacuum when the engine of the vehicle is running, said assembly comprising in combination, a supporting bracket, means to connect said bracket to said chassis frame adjacent said door, an arm pivotally connected at one end to said bracket and movable within a generally horizontal plane, a step connected to the opposite end of said arm, said arm being adapted to pivot relative to said bracket between a retracted position beneath the body of the vehicle and an operative position extending laterally from said frame in alignment with said door, a vacuum cylinder and plunger rod unit supported adjacent said bracket and connectable to said source of vacuum, a compression spring within said cylinder operable normally to project the outer end of said plunger rod outward from said cylinder, means interconnecting said outer end of said plunger rod to said arm for actuation of said arm and step, a latch carried by said arm and engageable with a keeper on said bracket when said arm is extended to releasably secure the same in said extended position, said latch being connected to said plunger rod and movable thereby to unlatched position prior to moving said arm and step to projected position, and a vacuum release valve movable to closed position by said door when the same is closed to cause vacuum to act upon said cylinder to move said plunger rod inward initially to unlatch said latch and then move said arm and step to retracted position and said door when opened moving said release valve to open position and thereby release the vacuum and permit said compression spring to reverse the movement of said plunger rod and project said arm and step to operative position and engage said latch with said keeper.

4,231,584

SKI BOOT HEEL BINDING EQUIPPED WITH SKI BRAKE

Toshikazu Kikuchi, Nagareyama, Japan, assignor to Hope Co., Ltd., Tokyo, Japan

Filed Dec. 18, 1978, Ser. No. 971,253

Claims priority, application Japan, Dec. 21, 1977, 52/152960; Jul. 10, 1978, 53/82958

Int. Cl.³ A63C *7/10*

U.S. Cl. 280—604 **7 Claims**

1. A ski boot heel binding equipped with a ski brake comprising:

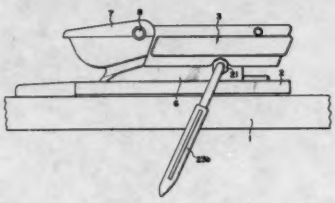
a base plate adapted to be attached to a ski plate;

a heel supporting body mounted on said base plate for sliding movement relative thereto in forward and rearward directions, said supporting body having a pair of side walls, an interior chamber, and a forward end supporting a heel engaging jaw;

a transverse shaft rotatably supported by said side walls of said supporting body and movable therewith;

a ski brake arm rigidly fixed to said transverse shaft and rotatable therewith between a braking position whereat said arm extends below the bottom of the ski plate and a non-braking position whereat said arm is above the bottom of the ski plate;

lever means, positioned within said chamber of said supporting body and rigidly fixed to said transverse shaft and



connected to a stationary portion of said base plate, for, upon rearward sliding moement of said supporting body when a ski boot is engaged with said jaw, causing said transverse shaft and thereby said arm to rotate to said non-braking position; and

spring means, positioned within said chamber of said supporting body, for normally urging said supporting body forwardly with respect to said base plate, and for thereby urging said lever means to rotate said transverse shaft and said arm to said braking position, but allowing rearward movement of said supporting body relative to said base plate when the ski boot is engaged with said jaw.

4,231,585

SKI FASTENING

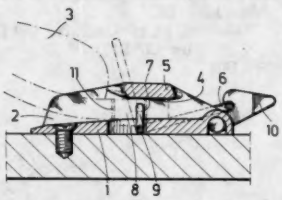
Pentti Riikonen, Kiverlönkatu 12 B 48, 15210 Lahti 21, Finland

Filed Nov. 14, 1978, Ser. No. 960,634

Claims priority, application Finland, Nov. 18, 1977, 773503

Int. Cl.³ A63C *9/10*

U.S. Cl. 280—615 **2 Claims**



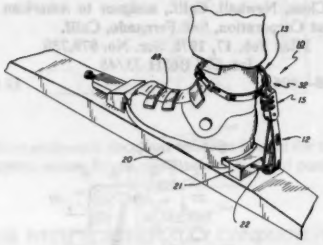
1. Improvement in a ski fastening comprising a base plate with upwardly directed side plates on both sides thereof, the top margins of said side plates being directed toward each other for supporting the sole of the skiing shoe, and a clamping yoke swivellably mounted on said base plate, said yoke having upwardly bent ends for entering, from below, holes provided in the sole of the skiing shoe, and bar means on the foremost portion of the base plate for securing said yoke in clamping position, wherein the improvement comprises that said yoke being swivellably attached to said base plate at the point of angulation of said upwardly bent ends so that on fastening the skiing shoe said upwardly bent ends of said yoke will urge the shoe forwardly so that its sole is impacted between said side plates, and the top margins of said side plates being mutually connected to form a bracing bridge.

4,231,586

COMBINATION SKI LOCK AND SAFETY STRAP

David A. Krause, 5648 Stevens Dr., S., Clay, N.Y. 13041

Filed Apr. 23, 1979, Ser. No. 32,382
Int. Cl.³ A63C 11/02
U.S. Cl. 280—637 11 Claims



1. A combination ski lock and safelty strap that includes

a lock having a female body section and a male shackle section receivable therein whereby the male shackle can be locked to the female body section, said lock further including a contoured aperture formed therein in which a strap may be slidably received,

a loop strap that is slidably received within the contoured aperture of said lock in close sliding relationship therewith having coacting fastening means at each end thereof for closing said loop and a pair of spaced-apart stops positioned on either side of the lock, said stops being of a size and shape to prevent them from passing through the aperture and thus limit the extent of travel afforded the loop strap within the lock,

a link secured in one end of the strap that is receivable in the shackle of the lock so that the link will be secured in the lock when the shackle is locked in the body section thereof,

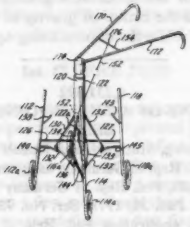
connecting means for securing the lock to a ski.

4,231,587

COLLAPSIBLE FRAMES FOR BABY CARRIERS

Henry Fleischer, 18 Notch Park Rd., Little Falls, N.J. 07424

Division of Ser. No. 759,081, Jan. 13, 1977, abandoned. This application Nov. 30, 1978, Ser. No. 964,975
Int. Cl.³ B62B 7/08
U.S. Cl. 280—647 11 Claims



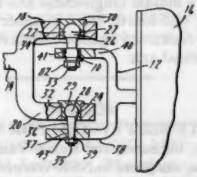
1. A frame mechanism for opening or closing frames for strollers, carriages and the like, comprising, in combination, at least a pair of spaced apart legs, each leg carrying at its lower end one or more wheels, a transversely disposed rod member connected to each of said legs with said legs extending above and below said transverse rod member, a longitudinally disposed elongated support member disposed between said legs, said longitudinal support member including openings through which said transverse rod member extends, said openings defining a path of movement for said transverse rod member as said transverse rod member is pulled upwardly thereby carrying said legs and wheels to a collapsed position, leg contact means disposed on said longitudinal support member and extending above and below said rod member, whereby said legs may be collapsed by pulling up on said transverse rod member causing said leg contact means to contact upper portions of said legs thereby causing the lower portions of said legs and said wheels attached thereto to pivot inwardly on said transverse rod member and when it is desired to open the legs and wheels, the transverse rod member is moved downwardly thereby causing said leg contact means to contact lower portions of said legs and thereby force said lower portions of said legs and said wheels to move outwardly to and remain in their open position.

4,231,588

ADJUSTING SLEEVE ASSEMBLY

David R. Wotton, Ann Arbor; Carroll D. Dickerson, New Hudson, and Lawrence A. Makowski, Livonia, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Apr. 9, 1979, Ser. No. 28,625
Int. Cl.³ B62D 17/00
U.S. Cl. 280—661 8 Claims



1. An adjustable mounting assembly for a steerable wheel assembly including lower and upper vertically spaced control arms connected to a supportive vehicle member, a spindle member on which a wheel is mounted, said spindle having an upper and lower arm connected to the respective upper and lower control arms, ball joints rotatably mounting each of said control arms to said spindle arms, said mounting assembly comprising;

a first sleeve being rotatably mountable in a hole in one of said upper or lower arms, one of said ball joints mounted in the other of said respective upper and lower arms;

said first sleeve having an aperture therethrough constructed to receive a stud integral with a ball forming one of said ball joints with said stud extending through said sleeve;

mounting means for selectively mounting said sleeve in said hole of said arm such that said aperture through said sleeve is selectively angled through said spindle arm;

said ball joint stud and sleeve being constructed to allow said stud to incline to extend through said angled aperture at any adjusted position of said sleeve;

locking means for fixedly locking said stud within said sleeve and said sleeve within said hole for securing said spindle in a desired position with respect to said control arms to mount said wheel assembly with a desired camber, castor, or pneumatic trail.

4,231,589

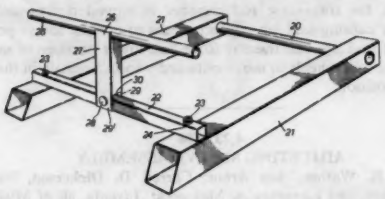
SUPPORTING FRAME FOR A VEHICLE SEAT

Bernard E. Hodgkins, Trowbridge, and Raymond C. C. Wadey, Westbury, both of England, assignors to Zimmer Orthopaedic Limited, London, England

Filed May 29, 1979, Ser. No. 42,312
Claims priority, application United Kingdom, May 31, 1978, 24840/78
Int. Cl.³ B62D 21/00
U.S. Cl. 280—781 7 Claims

1. A supporting frame for a vehicle seat, comprising longitu-

dinal, substantially rigid, first and second frame members extending at respective opposite sides of said frame, pivot means pivotably mounting said first and second frame members at respective adjacent end zones thereof for turning about a transverse axis, a transverse, substantially rigid, third frame member having its end zones connected to the respective first and second frame members at the other adjacent end zones thereof in such a manner that said other adjacent end zones can



move up and down relative to each other to a limited extent, and a substantially rigid, fourth frame member connected to said third frame member by a mounting at the middle of said third frame member allowing turning of said fourth frame member about a middle longitudinal axis relative to said third frame member, said fourth frame member serving to bear said seat and being restrained against excessive turning about said middle longitudinal axis.

4,231,590

SAFETY BELT SYSTEM FOR VEHICLES

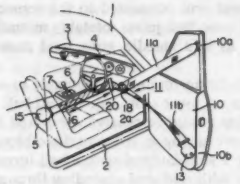
Shigeo Magane, Fujisawa, and Kazuo Yamamoto, Sagamihara, both of Japan, assignors to NSK-Warner K.K., Tokyo, Japan

Filed Mar. 7, 1979, Ser. No. 18,367

Claims priority, application Japan, Mar. 10, 1979, 53-29594[U]

Int. Cl.³ A62B *35/00*

U.S. Cl. 280—803 **2 Claims**



1. A passive safety belt system for a vehicle having a door with an edge hinged to a forward and side portion of the vehicle and having a seat with a first side adjacent to said door, said belt system comprising:

a first webbing providing a shoulder belt part and a waist belt part, the opposite ends of said first webbing being respectively positioned adjacent to upper and lower ends of the door edge opposite from the hinged edge;

first retractor means secured to said door, one end of said first webbing being connected to said first retractor means for protraction and retraction and the other end of said first webbing being secured to the door;

a loop member on said first webbing dividing said first webbing into said shoulder belt part and said waist belt part;

a second webbing having one end thereof attached to said loop member;

second retractor means adjacent to a second side of the seat opposite the first side, said second retractor means being connected to the other end of said second webbing for protraction and retraction, the retractive force of said second retractor means being stronger than that of said first retractor means; and

moving means engaged with said second webbing and movable along said second side of the seat in response to opening and closing of said door for moving both said webbings forward and backward relative to said seat.

4,231,591

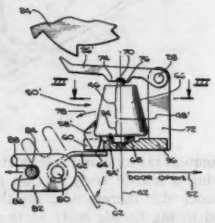
AUTOMATIC RETRACTOR INHIBITOR

Albert R. Close, Newhall, Calif., assignor to American Safety Equipment Corporation, San Fernando, Calif.

Filed Feb. 17, 1978, Ser. No. 878,730

Int. Cl.² B65H *75/48*

U.S. Cl. 280—806 **12 Claims**



1. In an inertially operated safety belt retractor adapted for mounting in a vehicular door which door has a movable locking member for engaging a mating member on the door frame for holding the door in a closed and locked position, the retractor including a spool rotatably journaled in a retractor frame and having an engaging surface for engagement by a pawl to prevent rotation thereof, a safety belt wound on the spool, a movable pawl for engaging the engaging surface of the spool to prevent protraction of the safety belt, and a high inertia mass contacting the pawl and pivoting about a first fulcrum point disposed horizontally from the center of gravity of the mass to move the pawl into engagement with the engaging surface of the spool during periods of high lateral force on the mass such as imposed in emergency conditions, the improvement for resisting the non-emergency engaging of the engaging surface of the spool by the pawl during normal opening of the vehicle door comprising:

(a) means for sensing that the vehicle door is being opened; and,

(b) means cooperating with said sensing means for disposing a superceding fulcrum point on which the mass must rotate to move the pawl into engagement with the engaging surface of the spool at a greater horizontal radial distance from the center of gravity of the mass than the first fulcrum while the door is being opened.

4,231,592

ARRANGEMENT OF A THREE-POINT AUTOMATIC BELT

Hans O. Scherenberg, Stuttgart, and Rudolf Andres, Sindelfingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Jun. 30, 1978, Ser. No. 920,681

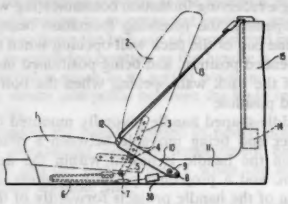
Claims priority, application Fed. Rep. of Germany, Jul. 2, 1977, 2730081

Int. Cl.³ B60R *21/10*

U.S. Cl. 280—808 **9 Claims**

1. An arrangement of a three-point automatic safety belt for a forward seat with a backrest in a two-door motor vehicle having rear seat means, said belt having a lower belt section and a belt band, said arrangement comprising roll-up means for the belt located within an area of a fixed vehicle side wall, and support means attached to said vehicle for receiving a fixed point of the lower belt section, the support means being operable to be transferred together with the belt band from a for-

ward operating position into a rear position freeing the ingress to the rear seat means, wherein a pivot movement of at least



one of a coordinated door and backrest is used for transferring the support means frrom one into another end position.

4,231,593

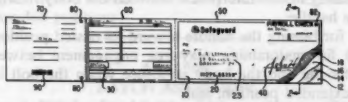
CHECK WITH ELECTRICALLY CONDUCTIVE LAYER

Vincent G. Bell, Jr., Berwyn; Thomas P. Burke, Harleysville, both of Pa.; George D. Margolin, Newport Beach, and Victor V. Vurpillat, Laguna Niguel, both of Calif., assignors to Centurion Data Corporation, King of Prussia, Pa.

Filed Feb. 21, 1978, Ser. No. 879,114

Int. Cl.³ B42D *15/00*

U.S. Cl. 283—6 **33 Claims**



1. A negotiable instrument comprising in combination:

a first layer,

a second layer overlying said first layer, and said layers having substantially different electrical conductivities and colors wherein at least one of said layer is opaque to light and one of said layers being electrically vaporizable by exposure to an electrical discharge.

4,231,594

PIPE JOINT STRUCTURE

Theodor Merkle, Konigsbronn; Bernhard Hausenblas, Landshausen; Hermann Schweickert, and Dieter Wengert, both of Heidenheim, all of Fed. Rep. of Germany, assignors to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

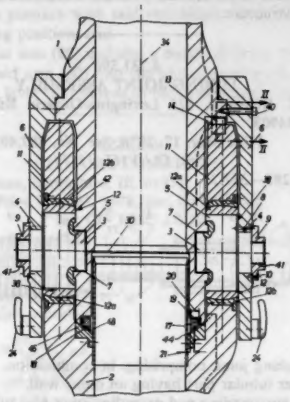
Filed May 8, 1978, Ser. No. 903,477

Claims priority, application Fed. Rep. of Germany, May 9, 1977, 2720758

Int. Cl.³ F16L *27/00*

U.S. Cl. 285—3 **13 Claims**

1. A jointed pipeline, comprising a succession of at least first second and third pipe members, first pivotal joint means operatively interconnecting one end of said first pipe member to a first end of said second pipe member, second pivotal joint means operatively interconnecting, a second end of said second pipe member to a first end of said third pipe member, said first pivotal joint means defining a first fixed pivotal axis extending transversely of said first and second pipe members for allowing said first and second pipe members to pivotally rotate thereabout relative to each other, said second pivotal joint means defining a second fixed pivotal axis extending transversely of said second and third pipe members for allowing said second and third pipe members to pivotally rotate thereabout relative to each other, said first and second pivotal axes being respectively contained in first and second planes which are substantially normal to each other, and stop means, said stop means being effective to limit the relative pivotal movement of said first pipe member relative to said second pipe member, said stop means comprising abutment type shear means, said shear means being effective to become sheared and further ineffective as abutment means when a force applied



thereagainst exceeds a predetermined magnitude which magnitude is less than that required to shear said first pivotal joint means.

4,231,595

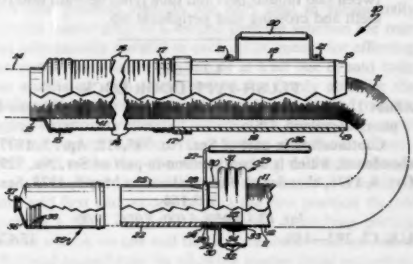
WASTE DISPENSING DEVICE FOR RECREATIONAL VEHICLES AND THE LIKE

Karl I. Knutsen, 9844 James Cir., Bloomington, Minn. 55431

Filed Nov. 29, 1978, Ser. No. 964,672

Int. Cl.² F16L *35/00*

U.S. Cl. 285—38 **4 Claims**



1. A waste dispensing device for recreational vehicles and the like comprising:

an elongate, flexible inner tubular member being longitudinally retractable and extensible between an extended position and a retracted position,

a coupling element secured to one end of said tubular member and being adapted to be attached to the waste outlet fitting of a recreational vehicle,

an elongate, rigid spout secured to the other end of said tubular member and projecting longitudinally therefrom,

an elongate, exterior housing structure positioned around said inner tubular member and including an elongate rigid cylindrical sleeve and an elongate flexible outer tubular member, said outer tubular member having one end thereof connected to said coupling element and having the other end thereof connected to said rigid sleeve, said exterior housing structure having a length dimension substantially less than one-half the length dimension of the inner tubular member when the latter is in the extended position,

an annular clamping cap positioned around and connected

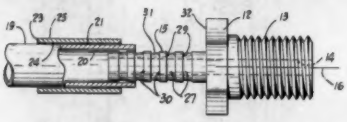
with said spout, the clamping cap releasably engaging an end portion of said rigid sleeve to retain the inner tubular member in a retracted position within said exterior housing structure.

4,231,596

TUBING JOINT ASSEMBLY

Ralph G. Ridenour, 626 Lexington-Ontario Rd., Mansfield, Ohio 44903

Filed Mar. 17, 1978, Ser. No. 887,491
Int. Cl.[2] F16L *13/14*
U.S. Cl. 285—382.2 **21 Claims**



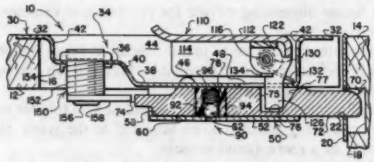
1. A tubing joint, comprising, in combination,
an inner tubular part having an outer wall,
a tube surrounding and extending over said tubular part,
retention means longitudinally retaining together said tubular part and said tube and including a lateral shoulder on said tubular part larger in cross-sectional area than and acting against a lateral abutment on said tube,
seal means establishing a fluid tight seal between said tubular part and said tube and including an annular laterally directed sharp-angled peripheral rib on said tubular part engaging an annular area on the inner wall of said tube,
said retention means including an inwardly compressed portion of said tube with a longitudinal row of a plurality of oppositely directed circumferentially extending teeth on the exterior surface of said tube, and
said fluid tight seal means including a zig-zag seal path between said tubular part and tube lying beneath said row of teeth and crossing said peripheral rib.

4,231,597

FLUSH-TYPE DOOR LOCK

Albert L. Pelcin, Aurora, Ohio, assignor to The Eastern Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 785,412, Apr. 7, 1977, abandoned, which is a continuation-in-part of Ser. No. 729,199, Oct. 4, 1976, abandoned. This application May 5, 1978, Ser. No. 903,164
Int. Cl.[2] E05B *5/00*; E05C *1/00*
U.S. Cl. 292—164 **15 Claims**



1. A flush-mountable door lock, comprising:
(a) a body structure having side and back walls which cooperate to define a forwardly facing recess, the back wall having a stepped configuration with a first part defining a relatively shallow recess portion and a second part defining a relatively deeper recess portion, and having an opening formed through the back wall;
(b) an elongate bolt slidably supported on the body structure at a location behind a portion of the back side of the second part, the bolt being movable between an extended position wherein the bolt is extended with respect to the body structure, and a retracted position wherein the bolt is retracted with respect to the body structure, the bolt having a receiving formation commuicating with the back wall opening, the receiving formation being positioned near one end of the back wall opening when the bolt is in its extended position, and being positioned near the other end of the back wall opening when the bolt is in its retracted position;
(c) a paddle-shaped handle pivotally mounted on the body member and being movable between a nested position wherein the handle is nested within the deeper recess portion, and a projected position wherein a substantial portion of the handle projects forwardly of the recess;
(d) detent means interposed between the body structure and the bolt for selectively releasably retaining the bolt in its retracted and extended positions and for assisting in moving the bolt to and positioning the bolt in its retracted and extended positions once the bolt closely approaches these positions;
(e) connecting means extending through the back wall opening and into the receiving formation for establishing a driving interconnection between the handle and the bolt which is operative to move the bolt out of its extended position and toward its retracted position as the handle is moved from its nested position to its projected position, and which is operative to move the bolt out of its retracted position and toward its extended position as the handle is moved from its projected position to its nested position;
(f) biasing means interposed between the body member and the handle:
(i) for biasing the handle toward its nested position;
(ii) for maintaining play-free engagement between the handle and the body structure when the bolt is in its extended position; and,
(iii) for maintaining a play-free driving connection between the handle and the bolt when the bolt is in its retracted position; and,
(g) the connecting means being operable to disengage the receiving formation when the bolt is extended and the handle is nested, the connection means including bolt actuator means extending through the back wall opening and being operably connected to the handle and to the receiving formation for moving the bolt from its extended position toward its retracted position when the handle is moved from its nested position to its projected position, and for moving the bolt from its retracted position toward its extended position when the handle is moved from its projected position to its nested position, the bolt actuator being operable to disengage the bolt when the bolt is in its extended position and the handle is in its nested position.

4. A flush-mountable door lock, comprising:
(a) a body structure having side and back walls which cooperate to define a forwardly facing recess, and having an opening formed through the back wall;
(b) an elongate bolt slidably supported on the body structure at a location behind a portion of the back wall, the bolt being movable between an extended position wherein the bolt is extended with respect to the body structure, and a retracted position wherein the bolt is retracted with respect to the body structure, the bolt having a receiving formation communicating with the back wall opening;
(c) detent means interposed between the body structure and the bolt for selectively releasably retaining the bolt in its retracted and extended positions, and for assisting in moving the bolt to and positioning the bolt in its retracted and extended positions once the bolt closely approaches these positions;
(d) a handle mounted on the body structure and being movable between a nested position wherein the handle is nested within the recess and a projected position wherein a substantial portion of the handle projects from the recess;
(e) connecting means extending through the opening and into the receiving formation for establishing a driving

interconnection between the handle and the bolt which is operative to move the bolt out of its extended position and toward its retracted position as the handle is moved from its nested position to its projected position, and which is operative to move the bolt out of its retracted position and toward its extended position as the handle is moved from its projected position to its nested position;

(f) biasing means interposed between the body member and the handle:

(i) for biasing the handle toward its nested position;

(ii) for maintaining play-free engagement between the handle and the body structure when the bolt is in its extended position; and,

(iii) for maintaining a play-free driving connection between the handle and the bolt when the bolt is in its retracted position;

(g) the connection means being operable to disengage the receiving formation when the bolt is extended and the handle is nested;

(h) a through-hole formed in the bolt having one end opening toward the body structure;

(i) a mounting sleeve formed from plastics material being carried in the through-hole;

(j) a closed-ended hole being formed in the mounting sleeve and having an open end facing toward the body structure; and,

(k) the detent means including a detent member positioned in the closed-ended hole together with spring means biasing the detent member toward the body structure for receiving the detent member when the bolt is in its retracted and extended positions.

4,231,598

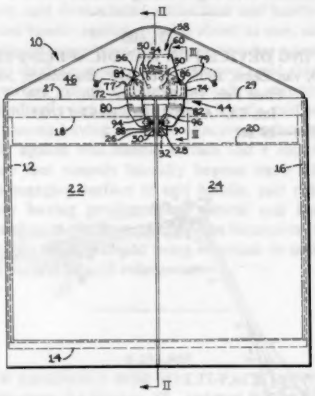
LATCH ASSEMBLY

Anthony J. Natale, Jr., Mentor, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed Aug. 25, 1978, Ser. No. 936,985

Int. Cl.[2] E05C *3/04*

U.S. Cl. 292—210 **7 Claims**



1. A latch assembly (44) comprising:

a base (48);

an arm (80);

means (50) for mounting said arm to said base (48), said arm being movable between open and closed positions;

a restraining lever (58) having a restraining portion (72);

means (54, 62, 64) for movably mounting said restraining lever (58) to said base (48), said restraining portion being movable between a restraining position and a release position; and

means (73) forming a first surface (73) on said restraining portion (72) for restraining said arm (80, 82) in the closed position with said restraining lever (58) in the restraining position and means (77) forming a second surface (77) on said restraining portion (72) for restraining said arm (80) in the open position with said restraining lever (58) in the restraining position; and

wherein said arm (80) includes a means (91) for wedgingly urging said arm (80) into the closed position as said restraining lever (58) moves to the restraining position.

4,231,599

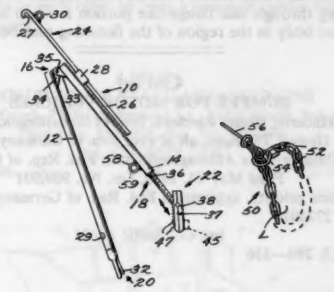
CLOSURE LOCK-PROP

Charles Gayman, Smithshire, Ill. 61478

Filed Dec. 21, 1978, Ser. No. 972,062

Int. Cl.[2] E05C *17/32*

U.S. Cl. 292—339 **13 Claims**



1. Apparatus for preventing the opening of a movable closure comprising first and second elongated rods; means for pivotedly mounting said first and second rods for movement from a first position wherein the rods abut in substantially end-to-end relationship to a second position wherein the rods extend substantially parallel to each other; means for effecting adjustment of the effective length of at least one of said rods; means associated with said first rod for firmly abutting the movable closure; means associated with said second rod for engaging a stationary member adjacent the closure to prevent relative movement between the closure and the stationary member; and means for selectively locking said first and second rods in the first position thereof; said means for selectively locking said first and second rods in the first position thereof comprising a third elongated rod having a latching portion formed as a hook on one end thereof; means formed on one of said first and second rods for allowing guided linear movement of said third rod parallel to said one of said first and second rods; and latching means formed on the other of said first and second rods for cooperating with said latching portion of said third rod to maintain said third rod latched in a position wherein it extends across said first and second rods in operative engagement with each; said latching means comprising means defining an aperture in said other of said first and second rods for receipt of said hook therein.

4,231,600

AUTOMOBILE BUMPER

Walter Braun, Sindelfingen; Hermann Burst, Rutesheim, and Dietmar Peter, Stuttgart-Feuerbach, all of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Fed. Rep. of Germany

Filed Oct. 17, 1978, Ser. No. 952,046

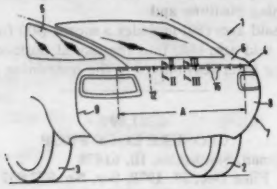
Claims priority, application Fed. Rep. of Germany, Oct. 21, 1977, 2747224

Int. Cl.[3] B60R *19/08*

U.S. Cl. 293—128 **8 Claims**

1. In an automobile bumper of the type having a support of

a rigid configuration and a covering of elastic material with a flangelike portion securable to a car body by fastening members, the improvement comprising:



a strip formed in a rigid configuration and provided over at least a partial extent of said covering, said strip having sleeves which extend from an outer surface of said covering through said flange-like portion so as to bear on the car body in the region of the fastening members.

4,231,601

BUMPER FOR MOTOR VEHICLES

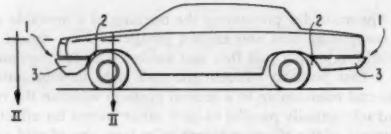
Fritz Häberle; Daniel Riechers, both of Sindelfingen, and Richard Heusel, Tübingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed May 24, 1978, Ser. No. 909,001

Claims priority, application Fed. Rep. of Germany, May 27, 1977, 2724016

Int. Cl.³ B60R *19/04*

U.S. Cl. 293—136 **10 Claims**



1. A bumper for motor vehicles yieldable in case of an impact and including bumper end portions laterally drawn about the vehicle, rigidly connected with the bumper center portion and extending approximately parallel to the vehicle outer surface, said end portions of the bumper being longitudinally displaceably guided at a distance from the vehicle outer surface, and a mounting bracket means rigidly connected with a respective bumper end portion and projecting with its free end into a guide means fixed at the vehicle, characterized in that the respective end portion includes a support means terminating at a distance from an associated wheel casing cutout, said support means having at its top side a cover means rigidly connected with the end portion, and the remaining area of the end portion being covered off by a downwardly projecting apron means which together with the cover means extends up to at least near the wheel casing cutout.

4,231,602

REFUSE COLLECTION DEVICE

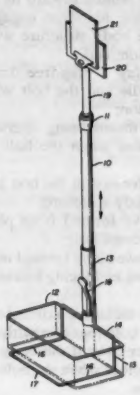
Frank N. Kinney, 300 Fountain Ave., Ellwood City, Pa. 16117

Filed Sep. 28, 1978, Ser. No. 946,540

Int. Cl.³ A01K *29/00*

U.S. Cl. 294—1 BA **1 Claim**

1. A refuse collection device comprising an elongated vertical handle, a sleeve movably mounted on said handle, vertically spaced horizontally positioned rectangular bag entering members on said handle and sleeve respectively and arranged for vertical movement toward and away from one another when said sleeve is moved relative to said handle, said bag entering member on said sleeve being vertically offset below said sleeve, first portions of said bag entering members extending from said handle and sleeve respectively in oppositely disposed horizontal right angles to said sleeve, the intermediate portions of said rectangular bag entering members being positioned at vertical right angles to said first horizontal portions whereby the remaining portions of said bag entering member on said sleeve are generally offset with respect to the plane of said bag entering member on said handle, said bag entering members adapted to enter and hold an open ended bag positioned thereover and hold and tension said bag in open end condition when moved apart vertically, a catch member on said sleeve selectively engagable with said handle whereby movement of said sleeve relative to said handle moves said bag entering members relative to one another so as to expand said open ended bag and hold the same on said members and permit said bag to be turned inside out so that a peripheral area of said bag is positioned around the opening thereof in folded relation over portions of said bag entering members.



4,231,603

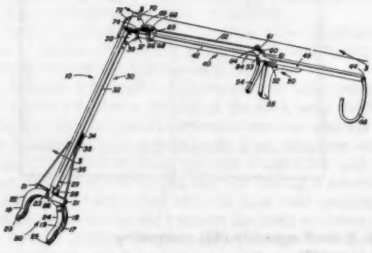
GRIPPING DEVICE FOR HANDICAPPED PERSONS

Willem D. van Zelm, 1005 Boyce Ave., Baltimore, Md. 21204

Filed Feb. 15, 1979, Ser. No. 12,336

Int. Cl.³ A47F *13/06*; B25J *13/02*

U.S. Cl. 294—19 R **9 Claims**



1. A gripping device to aid handicapped persons in reaching and picking up objects, comprising:

a gripping means;

a forward arm member connected to said gripping means;

a rearward arm member pivotally connected to said forward arm member to bring a gripped object at the distal end of said forward arm member to the position of the user of said gripping device; and

a control mechanism for controlling said gripping means and the movement of said forward arm member toward the user, said control mechanism including a remote thumb control means for operating said pivotally connected forward arm member and said rearward arm member, said pivotal connection causing said gripping means to approach the user to deposit said object.

4,231,604

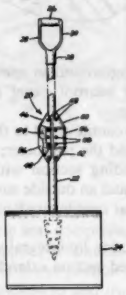
SHOVEL HAVING FULCRUM DEVICE

James J. Obergfell, 4407 Weisser Park, Fort Wayne, Ind. 46806

Filed Jun. 12, 1979, Ser. No. 47,728

Int. Cl.³ A01B *1/02*

U.S. Cl. 294—59 **3 Claims**



1. A lifting implement comprising an elongated handle having a load-carrying blade on one end,

a fulcrum device affixed to said handle intermediate the ends thereof in such position to impart a lifting movement to said blade when said device is engaged with the user's thigh and the other end of said handle is moved downwardly, said device being wider than said handle to stabilize said handle against rotation about its axis, said device including a supporting enlargement having a resilient pad on the thigh-engaging portion thereof, said thigh-engaging portion being convexly curved in directions both longitudinally and laterally of said handle, said supporting enlargement having an inner concave surface which fits snugly against said handle surface and a rounded outer surface that extends laterally beyond each side of the thigh-engaging surface of said handle, said enlargement further having predetermined lateral and longitudinal dimensions to distribute the fulcrum force over the area of the user's thigh, said pad being mounted on said rounded outer surface of said enlargement.

4,231,605

CARRIER ASSEMBLY FOR MULTI-PACK CONTAINERS

Fred C. Newman, La Grange, Ill., assignor to The Continental Group, Inc., Stamford, Conn.

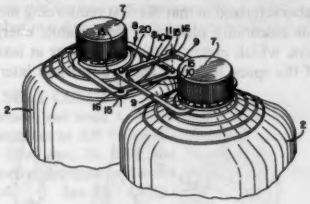
Filed Oct. 1, 1979, Ser. No. 80,373

Int. Cl.³ B65D *21/02*

U.S. Cl. 294—87.2 **10 Claims**

1. A carrier assembly for a pair of containers each of which comprises a body portion having lower and upper end portions;

a handle member connected to the upper end portion, each handle member having a pair of legs extending radially outwardly from the container and a transverse bar portion interconnecting the outer ends of said legs, said bar portions of said pair of containers being arranged in overlapped relationship with one another, and means releasably interconnecting the bar portions of the respective



handles to each other to form a common carrier for both containers.

4,231,606

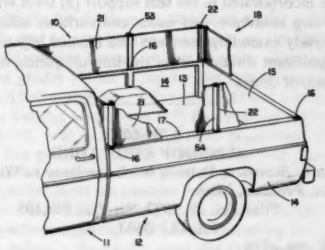
PICKUP TRUCK STAKE ARRANGEMENT

Robert P. Tuerk, 7710 Candlewood La., Indianapolis, Ind. 46250

Filed Dec. 11, 1978, Ser. No. 968,378

Int. Cl.³ B60P *7/06*

U.S. Cl. 296—43 **23 Claims**



1. A truck stake arrangement suitable for use in enclosing the bed of a pickup truck, comprising:

(a) a delta truck stake having a tapered bottom end removably seatable in the side wall pockets of a pickup truck bed;

(b) a plurality of dovetail slots in the wide wall of said delta stake, said slots being parallel and extending along a portion of the length thereof;

(c) a panel-receiving and supporting bracket defining a lateral groove therein for receipt and support of a wall enclosure panel; and

(d) a dovetail ridge extending along a portion of the length of said bracket and slidably and interchangeably received within said dovetail slots in said delta stake.

4,231,607

SIDE COLLISION PROTECTION SYSTEM FOR MOTOR VEHICLES

Nils I. Bohlin, Kungsbacka, Sweden, assignor to AB Volvo, Göteborg, Sweden

Filed Apr. 3, 1978, Ser. No. 893,053

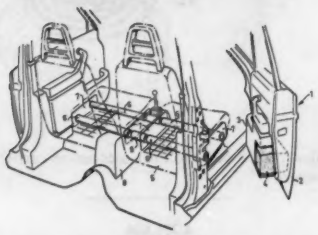
Claims priority, application Sweden, Apr. 14, 1977, 7704289

Int. Cl.² B60N *1/00*

U.S. Cl. 296—63 **13 Claims**

1. System for protecting motor vehicle occupants against injury in side collisions, comprising exterior and interior panels of a car body side and/or doors, a seat support, first reinforcing members arranged between the exterior and interior panels of the car body side and/or doors, and second reinforcing mem-

bers, incorporated in the seat support, and which extend transversely to the vehicle and are disposed to transmit, after a certain deformation of a press-loaded body side or door, the load to the floor of the vehicle and to the opposite body side or door, characterized in that the first reinforcing members (4) are made as essentially plastically deformable, energy absorbing members, which extend transversely over at least the greater part of the space between the exterior and interior panels (2



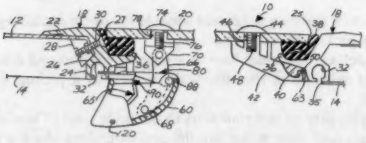
and 3 resp.) of the body sides and/or doors and which vertically cover an area level with the bumpers of the vehicle, and in that the second reinforcing members (6; 6,11) comprise transversely extending members which take up pressing loads and are incorporated in the seat support (5) level with the first reinforcing members, and outer end surfaces affixed to said transversely extending members and located adjacent to or at an insignificant distance from the interior panels of the body sides and/or doors.

4,231,608

SUNROOF STRUCTURE

Norman L. Sorensen, Detroit, Mich., assignor to Wisco Corporation, Ferndale, Mich.

Filed Jul. 29, 1977, Ser. No. 820,105
Int. Cl.[2] B60J 7/18
U.S. Cl. 296—216 **1 Claim**



1. A sunroof for a vehicle having an opening in its roof and comprising:

a frame extending about the edge of the opening and having a supporting surface lying in a plane substantially parallel to the vehicle roof;

a resilient section extending about a periphery of the opening to seal said opening carried by said supporting surface; and

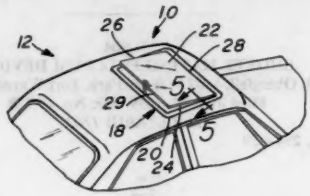
a panel adapted to be supported with its perimeter in abutment with said resilient section, said frame having an upright rigid supporting section; said resilient section comprising a tubular member having a base supported section, said tubular member being compressed by said panel when said panel is forced into engagement with said resilient section; said resilient section having a flange integral with said base and extending from said base with one side of said flange being laterally spaced from an adjacent side of said tubular member to define a slot thereinbetween extending from said base, the other side of said flange being in abutment with and supported by said upright frame section.

4,231,609

VEHICLE SUNROOF FRAME

Norman L. Sorensen, Detroit, Mich., assignor to Wisco Corporation, Ferndale, Mich.

Filed Nov. 30, 1978, Ser. No. 965,172
Int. Cl.[3] B60J 7/18
U.S. Cl. 296—218 **7 Claims**



1. A frame extending around an opening in a vehicle roof to support a removable sunroof panel and finish the opening perimeter comprising:

a horizontal flange cantilevered to the frame overlaying the vehicle top around the perimeter;

a downward extending section with an inside surface inclined inwardly and an outside surface inclined inwardly;

a horizontal section cantilevered into the opening spaced below the roof;

a downward projecting lip integral with the bottom surface of the cantilevered section extending around the perimeter;

means for nestingly receiving a pair of releasable latching bayonet cams;

means for transversely aligning the bayonet cams;

means for attaching a releasable latch assembly;

a trim ring member having a lower horizontal flange abutting the lip extending around the frame perimeter for securing the frame to the vehicle roof and finishing the inside of the opening; and

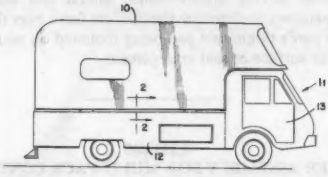
means for attaching the trim ring member to the frame.

4,231,610

CAMPER ANCHORING AND LOCKING STRUCTURE

Christopher A. Stoll, 2605 Janice La., Venice, Fla. 33595

Filed Mar. 30, 1979, Ser. No. 25,347
Int. Cl.[3] B60P 3/32
U.S. Cl. 296—167 **5 Claims**



1. A combined camper anchoring and locking structure for securing a camper body on a truck body comprising a first set of rail members secured to the undersurface of said camper body along the sides thereof, said rail members provided with grooves extending along the edges thereof, a second set of rail members having posts secured thereto and having grooves extending along the edges thereof, openings provided in the sides of said truck body for receiving said posts therein, said grooves in said first and second set of rail members engaging with one another with a means for maintaining said rail members in engaged relationship and a pivoted latch means mounted in said post for engagement with an opening formed

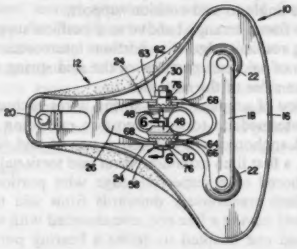
in one side wall of said truck body for releasably locking said camper body to said truck body.

4,231,611

CYCLE SEAT AND CLAMP THEREFOR

Martin J. Bird, Norwalk, Ohio, assignor to Persons-Majestic Manufacturing Company, Monroeville, Ohio

Filed Jul. 10, 1978, Ser. No. 923,059
Int. Cl.³ B62J *1/00*
U.S. Cl. 297—195 **19 Claims**



1. A cycle seat mountable on cycles having support posts of differing sizes, said cycle seat comprising:

a saddle having an upper portion and a lower portion;

a truss attached to the lower portion of said saddle; and,

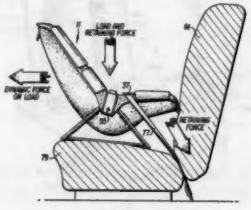
a clamp rotatably attached to said truss at a pivot point for mounting the seat on a cycle support post, said clamp comprising a plurality of receptacles for respectively receiving the support posts of differing sizes, wherein said receptacles are spaced generally equi-angularly about said pivot point.

4,231,612

BABY CARRIER AND CAR SEAT

Paul K. Meeker, Kent, Ohio, assignor to Questor Corporation, Toledo, Ohio

Continuation of Ser. No. 845,776, Oct. 26, 1977, abandoned. This application Sep. 1, 1978, Ser. No. 938,874
Int. Cl.² A47D *1/10*
U.S. Cl. 297—250 **3 Claims**



1. In a baby carrier and car seat having a seat, back and sides; tilting, supporting and locking devices on opposite sides of said seat, each of said tilting and locking mechanisms comprising

a compartment secured to said side;

a plate member having a peripheral arcuate flange;

means for pivotally mounting said plate member to said side and within said compartment;

a support stand secured to said plate member and pivotable therewith;

a plurality of teeth depending from the inner side of said arcuate flange;

a depressable button member adjacent said plate member and extending upwardly through said compartment;

a plurality of teeth on said button member of a configuration so as to nest with said teeth on said plate member; and

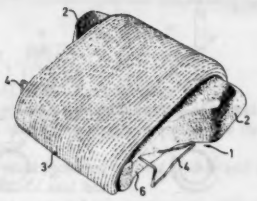
spring means within said compartment for biasing said button member in a direction so as to cause said teeth to mesh.

4,231,613

CHILD'S SEAT CUSHION FOR MOTOR VEHICLES

Kjell O. Jonasson, and Sven Å. Andersson, both of Gothenburg, Sweden, assignors to AB Volvo, Gothenburg, Sweden

Filed Apr. 26, 1979, Ser. No. 33,491
Claims priority, application Sweden, May 2, 1978, 7805018
Int. Cl.³ A47D *1/10*
U.S. Cl. 297—250 **6 Claims**



1. In a cushion for children, to be placed on the seat bottom of a vehicle seat to provide the child with an elevated sitting position, said cushion having on two opposite sides uniformly constructed guides (4) for a regular hip belt arranged in the vehicle, said belt comprising a first part (12) and a second part (16) with a locking mechanism (15) for coupling together the two belt parts, said guides being each engageable with an individual belt part in order to, when the cushion is placed in the position for use on the seat bottom and the belt parts are coupled together, hold the cushion in place on the seat bottom and prevent the belt from sliding up on the body of the passenger, each guide comprising a forwardly extending first portion (9), which defines a forwardly open slot (10), through which the first part of the belt is adapted to pass; the improvement in which each guide (4) has a second portion (13), spaced from the first portion (9) and extending laterally from the cushion to form a stop for the second belt part (16) with the locking mechanism (15), said stop being arranged to prevent upward displacement of the locking mechanism in relation to the cushion.

4,231,614

WHEELCHAIR

Gene P. Shaffer, 5139 Hazeltine, Sherman Oaks, Calif. 91423

Filed Oct. 27, 1978, Ser. No. 955,391
Int. Cl.² A47C *1/02*
U.S. Cl. 297—330 **17 Claims**

1. An improved wheelchair for mechanically assisting in moving a disabled person between a sitting and a standing position, said wheelchair comprising:

a base;

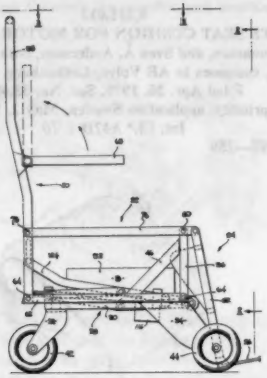
a seat located above said base and hingedly connected to said base through a first pivotal axis means, said first pivotal axis means for allowing rotation of said seat in an arc relative to said base;

a back located behind said seat and hingedly connected to said seat through a second pivotal axis means which is separated from and movable relative to said base, said second pivotal axis means for allowing said back to move both upwardly, downwardly and laterally relative to the front end of said seat and upwardly, downwardly and laterally relative to said base;

lever means located below said seat, pivotally mounted on said base and connected to said back, said lever means for

causing said upward, downward and lateral movements of said back relative to the front end of said seat and to said base, and for causing said rotation of said seat relative to said base;

a lower-leg rest hingedly attached to the front end of said seat through said first pivotal axis means, said first pivotal axis means for allowing pivotal upward and downward



movements of said lower-leg rest relative to said seat and said base;

cam means coupled between said lever means and said lower-leg rest for causing said lower-leg rest to move pivotally relative to said seat; and

power means on said wheelchair and in operative connection with said lever means, said power means for actuating said lever means.

4,231,615

SEAT FRAMES

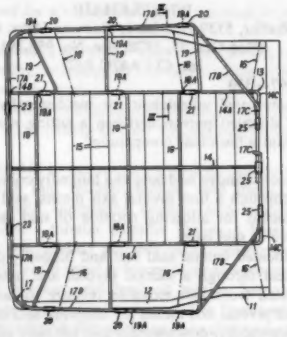
David T. Griffiths, Pontardulais, Wales, assignor to Youngflex S.A., Fribourg, Switzerland

Continuation of Ser. No. 818,505, Jul. 25, 1977, abandoned, which is a division of Ser. No. 604,177, Aug. 13, 1975, Pat. No. 4,050,738, which is a continuation-in-part of Ser. No. 440,782, Feb. 8, 1974, abandoned. This application Nov. 30, 1978, Ser. No. 964,987

Claims priority, application United Kingdom, Feb. 16, 1973, 7874/73

Int. Cl.[2] A47C *7/35*

U.S. Cl. 297—452 **4 Claims**



1. A seat frame comprising:

(a) a base frame;

(b) a non-extendible cushion support including logitudinally extending side wire portions and a plurality of spaced transversely extending cross wires anchored between said side wire portions;

(c) a plurality of tension spring means anchored between said side wire portions and said base frame to suspend said cushion support in tension transversely with respect to said base frame;

(d) a plurality of spaced spring wires each comprising a central portion extending transversely between said side wire portions, intermediate torsional portions extending parallel with and anchored to said side wire portions, and end portions extending transversely and outwardly from said torsional portions in an upward direction from and at an obtuse angle to said cushion support;

(e) an edge frame arranged above said cushion support and including resilient edge wire portions interconnecting the free ends of said end portions of the said spring wires at respective sides of the seat; and

(f) a plurality of supplementary spring wires each comprising an intermediate torsional portion extending parallel with and anchored to a respective one of said side wire portions, a first limb extending from said torsional portion and anchored to a respective edge wire portion and a second limb transversely outwards from said torsional portion and having a free end, unconnected with said base frame, said end adapted to define a bearing portion for engagement with said base frame and located for transmission of reaction force to said base frame upon application of a load to the respective edge wire portion, whereby said free ends can move relative to said base frame upon extension of said plurality of tension spring means.

4,231,616

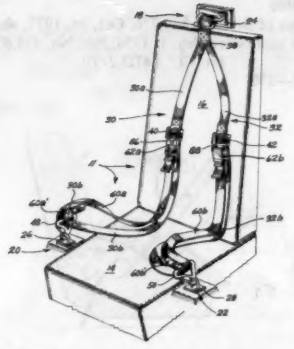
COMBINED SHOULDER HARNESS AND LAP BELT RESTRAINT APPARATUS HAVING SINGLE FASTEN/RELEASE POINT AT LAP BUCKLE

Mark C. Painter, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Aug. 17, 1979, Ser. No. 67,479

Int. Cl.[3] A62B *35/00*; B64D *11/06*

U.S. Cl. 297—481 **9 Claims**



1. In a combined shoulder harness and lap belt restraint apparatus for cooperative arrangement with a seat and associated seat back, and which includes first and second shoulder straps that extend forwardly from a shoulder harness anchor means located behind the seat back so as to pass over opposite shoulders of an occupant and downwardly therefrom along the sides of an occupant's upper torso toward first and second side anchor means respectively located adjacent opposite sides of the seat, and a lap belt that pases across an occupant's lap and includes first and second belt portions releasably connected together at their adjacent ends by lap buckle means and sepa-

rately and fixedly attached at their remote ends to said first and second side anchor means, respectively, wherein the improvement comprises:

anchor guide means provided on each of said first and second side anchor means, said first and second downwardly extending shoulder straps being separately and respectively looped through said anchor guide means on said first and second anchor means, and the end portions of the thusly looped first and second shoulder straps being drawn respectively inwardly from said first and second side anchor means so as to lie along said first and second belt portions, respectively; and

first and second attachment means, said first attachment means for fixedly attaching the end portion of said first shoulder strap to said first belt portion at a point thereon intermediate said first side anchor means and said lap buckle means, and said second attachment means for fixedly attaching the end portion of said second shoulder strap to said second belt portion at a point thereon intermediate said second side anchor means and said lap buckle means.

4,231,617

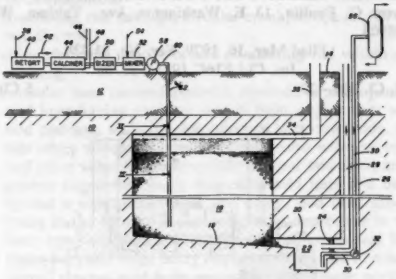
CONSOLIDATION OF IN-SITU RETORT

Olaf A. Larson, O'Hara Township, Allegheny County, Pa., and Charles W. Matthews, Lakewood, Colo., assignors to Gulf Oil Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 816,389, Jul. 18, 1977, abandoned. This application Dec. 14, 1978, Ser. No. 969,328

Int. Cl.³ E21C *41/10*

U.S. Cl. 299—2 **19 Claims**



1. A method of consolidating a rubblized in-situ oil shale retort, after in-situ retorting of the shale is completed comprising:

(a) retorting oil shale at the ground surface;

(b) preparing an aqueous slurry of spent shale from the surface retorting; and

(c) pumping the slurry into the in-situ retort; wherein the pumping of step (c) is accomplished by discharging the slurry into the in-situ retort at successively higher levels in the retort and squeezing the slurry into fissures between blocks of in-situ retorted rubblized spent shale at each level to fill void space in the in-situ retorted shale, the squeezing of the slurry being accomplished at high pressures adapted to apply a pressure on walls of the retort below the fracturing pressure of the oil shale formation.

4,231,618

TUNNEL-EXCAVATING MACHINE

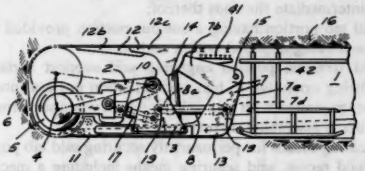
Friedrich W. Paurat, Nordstrasse 73, 4223 Voerde, Fed. Rep. of Germany

Filed Dec. 2, 1977, Ser. No. 857,191

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1977, 2710960

Int. Cl.² E21C *25/68, 25/06*

U.S. Cl. 299—31 **6 Claims**



1. A tunneling machine comprising:

a chassis displaceable along a stretch of tunnel to be excavated in a subterranean structure toward a face thereof to be cut away;

at least one beam mounted on said chassis and extending in the direction of said face;

cutting means on said beam engageable with said face for excavating same;

a roof support unit disposed rearwardly of said chassis and adapted to brace against the roof and floor of the tunnel behind said chassis;

a fluid-pressure cylinder arrangement interconnecting said roof support unit and said chassis as the sole means interconnecting same for relatively displacing said chassis and said roof support unit along said tunnel, said beam being displaceable relative to said chassis toward and away from said face; and

means for swingably mounting said beam on said chassis about a horizontal axis, said chassis being provided in the region of said cutting means with forwardly displaceable support skids riding on the floor of said tunnel, said cutting means including at least one cutting drum journaled on said beam for rotation about an axis substantially parallel to said face, said roof support unit comprising a roof-engaging cantilevered cap overhanging said chassis, said drum comprising a plurality of drum sections interconnected by respective universal joints and inclinable relative to one another.

4,231,619

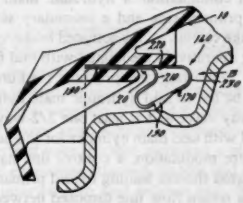
WHEEL TRIM RETENTION MEANS

Hans R. Beisch, Amherstburg, Canada, and Heinrich J. Hempelmann, Livonia, Mich., assignors to Norris Industries, Inc., Ypsilanti, Mich.

Continuation of Ser. No. 786,422, Apr. 11, 1977, abandoned. This application Nov. 27, 1978, Ser. No. 963,735

Int. Cl.³ B60B *7/06*

U.S. Cl. 301—37 P **19 Claims**



1. Retention means for retaining wheel trim formed of a plastic material on the axially outer face of a vehicle wheel

having an annular wheel flange, said retention means comprising:

means defining a generally axially inwardly opening recess on said wheel trim;

means defining a generally radially outwardly facing support surface on said wheel trim positioned radially inwardly of said recess;

a spring clip having a tab portion at one end thereof, a terminal portion at the other end thereof and a retention portion intermediate the ends thereof;

said tab portion having a cut out portion provided therein and being disposed within said recess,

said terminal portion engaging said support surface and being operative to bias said retention portion into biting engagement with said vehicle wheel when said trim member is assembled thereto; and

securing means for permanently securing said tab portion in said recess, said securing means including a mechanical interlock created by said plastic material of said wheel trim being at least partially disposed within said cut out portion of said tab portion.

4,231,620

ANTI-LOCK APPARATUS FOR A HYDRAULIC BRAKE SYSTEM

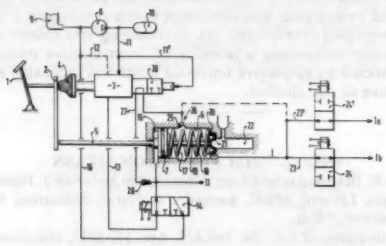
Heinz Leiber, Leimen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed May 21, 1979, Ser. No. 41,144

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1978, 2825087

Int. Cl.³ B60T *8/02*

U.S. Cl. 303—119 **5 Claims**



1. An anti-lock apparatus for a hydraulic brake system comprising, in combination: a hydraulic main cylinder having a piston, a primary side and a secondary side for supplying a closed brake circuit, a foot-actuated brake valve, a travel-limiting spring operatively associated with said foot-actuated brake valve for permitting the pressure medium from a pressure source to be fed to said hydraulic main cylinder primary side, one 3/2-way valve and at least one 2/2-way valve operatively associated with said main cylinder for the purpose of anti-locking pressure modulation, a control line having said 3/2-way valve inserted therein leading to said primary side of said main cylinder, a return flow line disposed between said main cylinder secondary side and primary side, and a switchover valve dependent on storage container pressure for monitoring the passage of said return flow line.

4,231,621

SLIDING ROLLER BEARING WITH HEIGHT ADJUSTOR

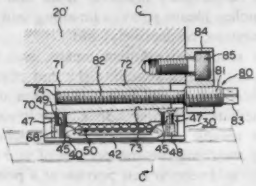
Hiroshi Teramachi, 2-34-8, Higashi-Tamagawa, Setagaya-ku, Tokyo, Japan (158)

Filed Apr. 2, 1979, Ser. No. 26,453

Claims priority, application Japan, May 4, 1978, 53-052791

Int. Cl.² F16C *29/12, 29/06*

U.S. Cl. 308—6 C **2 Claims**



1. A sliding roller bearing comprising: a bearing member forming at one side an open ended bearing chamber and at the other side a flat surface formed with a tapered groove; an elongated track shaft having a longitudinal portion engageable with said bearing chamber; a tapered gib having a flat upper surface, a lower surface conforming to the bottom of said tapered groove, and a threaded hole extending centrally and longitudinally therethrough, said tapered gib being received in said tapered groove for sliding movement; and an adjusting bolt having at one end portion a male screw threadedly engaged with said threaded hole and at a middle portion a second male screw threadedly engaged with a flange portion of said bearing member so that the revolution of the bolt causes sliding movement of the tapered gib in said tapered groove, thereby causing a change in the distance between the said flat upper surface of said gib and the bottom surface of said track shaft.

4,231,622

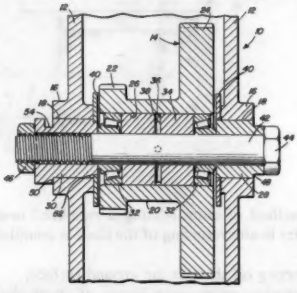
TAPERED BEARING KIT FOR INTERMEDIATE GEAR

Grover G. Paullin, 13 E. Washington Ave., Yakima, Wash. 98903

Filed Mar. 16, 1979, Ser. No. 21,434

Int. Cl.³ F16C *19/14, 25/06*

U.S. Cl. 308—22 **5 Claims**



1. A kit for converting an intermediate gear in a transfer case from a needle bearing supported gear to a tapered roller bearing supported gear comprising a pair of tapered roller bearing assemblies adapted to be received in the internal bore of an intermediate gear, a spacer adapted to be interposed between the bearing assemblies, an elongated bolt-type shaft adapted to extend through aligned bores in opposite walls of a transfer case, the bearing assemblies and spacer, and a pair of adapter bushings adapted to be received in the bores in the opposite

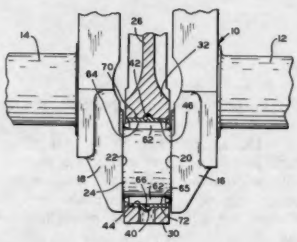
walls of the transfer case and adapted to receive the bolt-type shaft, said bolt-type shaft including means adapted to engage the outer ends of the bushings to enable the supporting assembly for the intermediate gear to be retained in position and the bearing assemblies preloaded by exerting predetermined axial force thereon, one of said bushings including an outwardly offset peripheral shoulder adjacent the axial outer end adapted to engage the exterior of the transfer case to limit movement of said one bushing inwardly of the transfer case, said bushing shoulder including a transversely extending groove communicating with a portion of the outer periphery thereof and adapted to receive a lock plate attached to the transfer case to lock said one bushing to the transfer case thereby securing the bolt-type shaft and other components of the support for the intermediate gear and the intermediate gear itself within the transfer case.

4,231,623

STEEL CONNECTING ROD BEARING LINER FOR INTERNAL COMBUSTION ENGINES

Vernon R. Kaufman, Cedarburg, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Oct. 2, 1978, Ser. No. 947,517
Int. Cl.³ F16C *13/14*
U.S. Cl. 308—23 **13 Claims**



1. In combination:
a connecting rod having a circular crankpin opening in one end thereof,
a circumferential groove in said connecting rod within said opening,
an annular liner circumferentially received in said opening, said liner having an outer side in tight engagement with said opening, an inner side opposite said outer side, and side edges which are generally coextensive with said inner and outer sides circumferentially around said liner, and
a groove circumferentially formed in said liner and being spaced inwardly from said side edges, said liner groove being in the form of a circumferential depression in said liner inner side and a circumferential ridge on said liner outer side, said ridge being disposed within said first-mentioned groove, said liner comprising side flange portions extending between said groove and said side edges, said side flange portions being substantially flat in the axial direction such that said groove forms a discontinuity within said liner intermediate said side edges.

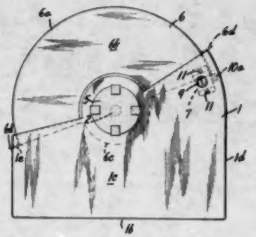
4,231,624

LOCKING ROTARY FILE

Hildaur L. Neilsen, Metuchen, N.J., assignor to The Rolodex Corporation, Secaucus, N.J.

Filed Nov. 9, 1978, Ser. No. 959,176
Int. Cl.² B42F *17/00*; A47B *49/00*
U.S. Cl. 312—186 **4 Claims**

1. In a rotary file comprising a case open at the top and having a front wall, side walls and a back wall, a rotor rotatable in said case and comprising a shaft extending through and rotatably supported by said side walls and at least one knob fixed on an end of said shaft externally of said case for turning said rotor, and a cover comprising a cylindrical wall and opposite side walls received inside the walls of said case and rotatable about said shaft for rotation of said cover between a closed position in which said cylindrical wall closes the top of said case and an open position in which said cylindrical wall is received in rear and lower portion of said case, leaving the top of said case open; means for locking said cover in closed posi-



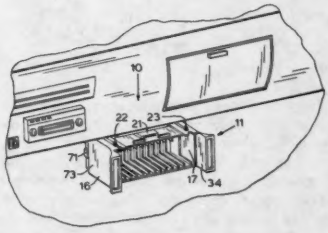
tion comprising a lock mounted in a side wall of said case and having a rotary barrel rotatable by a key and a locking member inside said case and movable by rotation of said barrel between a locked position in which it engages a side wall of said cover when in closed position to secure said cover from being opened, and an unlocked position in which said locking member is free of said side wall of said cover to permit rotation of said cover from closed to open position.

4,231,625

TAPE STORAGE CABINET

Jose L. Perez, C-29, 10th Ave., Lincoln Gardens, Key West, Fla. 33040, and Humberto A. Jimenez, 775 W. Dennis, Wheeling, Ill. 60090

Filed Dec. 29, 1978, Ser. No. 974,216
Int. Cl.² A47B *67/02*
U.S. Cl. 312—245 **8 Claims**

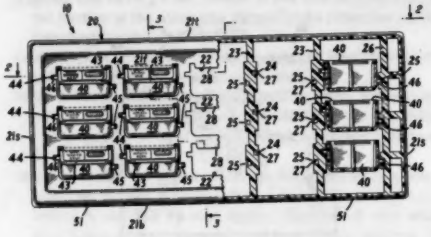


1. A cabinet for tapes comprising a container having a top wall, a bottom wall, a back wall and first and second side walls, first and second front cover members each having a front panel and top and bottom panels attached thereto including a plurality of U-shaped partition members attached to said top, bottom and back walls and spaced apart a distance sufficient to receive tape cartridges therebetween, further including a plate with a plurality of parallel extensions attached thereto and capable of being detachably inserted into said cabinet and the spacing between said parallel extensions being about equal to the spacings between said partition members and such that tape cassettes are receivable therebetween.

4,231,626
STORAGE SYSTEM

James S. Amtmann, Avon, and Louis G. Bobrowski, Berlin, both of Conn., assignors to The Stanley Works, New Britain, Conn.

Filed Feb. 12, 1979, Ser. No. 11,487
Int. Cl.³ A47B 77/00, 87/00
U.S. Cl. 312—350 16 Claims

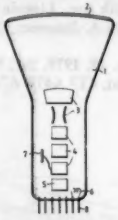


1. A combination cabinet and drawers to be combined as a storage system, the combination including a cabinet having multiple drawer receiving openings in a face thereof, and multiple drawers, said drawers being boxes, keying means cooperating between the cabinet and the drawers for permitting insertion of only correctly keyed drawers into the cabinet for use therein.

4,231,627
ELECTRON BEAM TUBE

Klaus Schaffernicht, Blaustein, and Rainer Kolbeck, Ulm, both of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 15, 1979, Ser. No. 12,477
Int. Cl.³ H01J 9/38
U.S. Cl. 316—25 4 Claims



1. In a method for evacuating an electron beam tube having an electrically heatable cathode whose heating power is less than 250 mW, which method includes producing a getter surface on interior walls of the tube, the improvement comprising and providing within the tube a metal member separate from the cathode and capable of being heated to above 800° C.; and supplying heating power to said member sufficient to heat it to above 800° C. after formation of the getter surface.

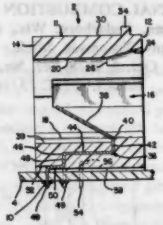
4,231,628
ELECTRICAL CONNECTOR RECEPTACLES

Donald W. K. Hughes, Mechanicsburg, Pa., and John H. F. Lauterbach, Clearwater, Fla., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 14, 1978, Ser. No. 969,504
Int. Cl.³ H01R 13/40, 13/54
U.S. Cl. 339—17 LC 6 Claims

1. An electrical connector receptacle of the telephone jack type comprising an insulating housing having a plug-receiving end and a rearward end, a plug-receiving opening extending into said plug-receiving end, said opening having opposed internal sidewalls and opposed internal endwalls, said housing having oppositely directed external sidewalls and oppositely directed external endwalls, a plurality of electrical conductors in side-by-side spaced-apart relationship, each of said conductors comprising a first end which serves as a contact spring extending from one of said internal sidewalls diagonally into said opening and towards said rearward end, an intermediate portion extending from said plug-receiving end through said housing between said one internal sidewall and the adjacent external sidewall and towards said rearward end and a second end which extends externally of said housing, said plug-receiving opening being dimensioned to receive a connector plug having spaced-apart contact members therein which engage said contact springs, said connector receptacle being characterized in that:

said housing comprises a one-piece molded part and said conductors comprise single-piece stamped and formed



members, said intermediate portions of said conductors being insert molded in said housing, said second ends of said conductors emerging from said adjacent external sidewall, said first ends of said conductors emerging from said one internal sidewall at a location proximate to said plug-receiving end, said intermediate portion of each conductors being tightly and immovably embedded in said housing, and said opening extends through said housing and opens onto said rearward end,

said connector having been manufactured by the steps of producing a continuous conductor strip comprising a carrier strip having groups of said conductors extending laterally therefrom, positioning one of said groups of said conductors in the cavity of a molding apparatus with said first ends of said conductors clamped between the ends of aligned core pins, injecting molding material into said cavity, removing the molded connector receptacle from said molding apparatus, and severing said carrier strip from said conductors.

4,231,629
APPARATUS FOR CONNECTION OF COAXIAL CABLES TO A PRINTED CIRCUIT MOTHER BOARD

Robert E. Kirby, Garner, N.C., assignor to Telex Computer Products, Inc., Raleigh, N.C.

Filed Jan. 18, 1979, Ser. No. 4,460
Int. Cl.³ H01R 17/18; H05R 1/12
U.S. Cl. 339—17 M 3 Claims

1. Apparatus for connection of a coaxial cable to a printed circuit mother board, comprising:

(a) a rigid metal chassis;

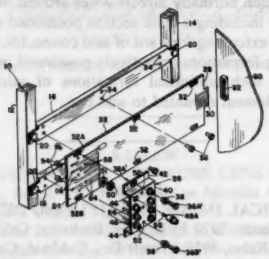
(b) a flexible adapter board rigidly removably fastened to and supported by said chassis at a first end, and adapted to be removably plugged into said mother board at its second end;

(c) a metal bracket, and means to attach said metal bracket to said adapter at said first end of said adapter; at least one opening through said bracket and including at least one conventional coaxial cable terminal, locked to said bracket by screw means; pin connector means extending from said coaxial cable terminal on said bracket, and

adapted to pass through a prepared opening in, and to be soldered to, a metal conductor on the surface of said adapter;

(d) multiple screw means passing through said bracket and said adapter into said chassis to lock said bracket and said adapter thereto;

(e) male connector means on said second end of said adapter, and conductor means on said adapter connecting said pin



of said at least one coaxial cable terminal to said male connector means;

(f) main logic mother board removably attached to said chassis and having at least one connector socket adapter to receive said male connector on said adapter;

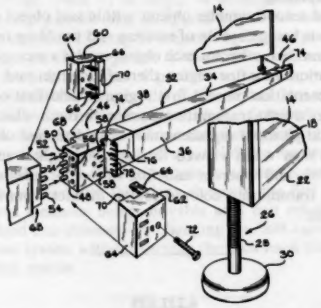
whereby a coaxial cable plugged into said coaxial cable terminal on said bracket can be connected to a circuit on said mother board without carrying vibrations to said mother board.

4,231,630

UNDER THE WALL ENERGY SUPPLY SYSTEM FOR A SPACE DIVIDER SYSTEM

Robert L. Propst, and Michael A. Wodka, both of Ann Arbor, Mich., assignors to Herman Miller, Inc., Zeeland, Mich.

Filed Apr. 23, 1979, Ser. No. 32,523
Int. Cl.³ H02G *3/26*
U.S. Cl. 339—22 R **7 Claims**



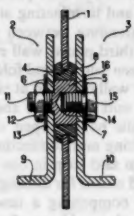
1. In a space divider system which includes a plurality of upright wall panels arranged end-to-end, each of said panels having spaced apart opposite faces extending longitudinally of said panel between the ends thereof and a lower edge extending transversely between said faces and longitudinally of said panel between said ends, leg supports supporting each of said panels on a supporting surface in a position in which said lower edge is spaced a predetermined distance above said supporting surface, an energy supply system comprising a plurality of raceway sections disposed below selected ones of said panels, each of said raceway sections corresponding to one of said selected wall panels and containing electrical conductors for transmitting electrical energy along the lower edge of an associated wall panel, each of said raceway sections having sidewalls and a bottom wall and being disposed adjacent the lower edge of an associated panel to provide an essentially unbroken appearance between said raceway section sidewalls and said faces of said associated panel, the bottom wall of each of said raceway sections being disposed a predetermined distance above said supporting surface to establish a clearance between said bottom wall of said raceway section and said supporting surface, and cooperating releasable mounting means on each of said raceway sections and an associated wall panel enabling each of said raceway sections to be mounted on and demounted from said associated wall panel by movement of said raceway section as a single unit transversely of said associated wall panel so that a plurality of wall panels can be maintained in said end to end arrangement when said raceway sections are mounted and demounted from said upright wall panels.

4,231,631

THROUGH-CONNECTOR PROVIDING AN ELECTRICAL CONNECTION THROUGH A SINGLE OR DOUBLE PLASTIC WALL AND APPLICATION THEREOF TO AN ELECTRICAL BATTERY

Jean-Marc Guerinault, Merignac, and Jacques Barber, Lormont, both of France, assignors to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville, France

Filed Dec. 15, 1978, Ser. No. 970,067
Claims priority, application France, Jan. 18, 1978, 78 01347
Int. Cl.³ H01R *7/02*
U.S. Cl. 339—94 A **11 Claims**



1. A sealed electrical through-connector assembly including a barrier of predetermined thickness; a connecting member extending through a hole in the barrier; a resilient annular seal ring surrounding the connecting member, the seal ring having an uncompressed thickness greater than the thickness of the barrier and an outer perimetral surface making sealing contact with the inner surface of the hole through the barrier; a first metal part mounted on said connecting member and positioned on one side of said seal ring; a second metal part mounted on the connecting member and positioned on the other side of the seal ring; and means for applying a releasable clamping force against said metal parts for axially compressing said seal ring, wherein the improvement comprises:

rigid spacer means defining the positions of said parts relative to each other, thereby determining a fixed compression of the seal ring for any clamping force above a predetermined minimum valve.

4,231,632

CONTACT ELEMENT FOR INSULATION PIERCE TYPE

Jean-Marie Badoz, and Daniel Merceron, both of Suresnes, France, assignors to Socapex, Suresnes and Souriau et Cie, Boulogne, both of, France

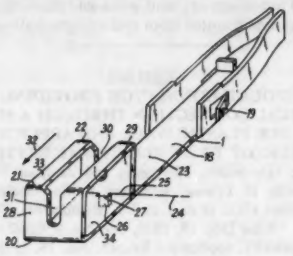
Filed Dec. 18, 1978, Ser. No. 970,854
Claims priority, application France, Dec. 22, 1977, 77 38829
Int. Cl.³ H01R *4/02*
U.S. Cl. 339—97 R **7 Claims**

1. A contact element having a longitudinal axis, for an insula-

tion piercing type connector for wire covered with an insulating sheath, comprising:

a front member (1) and a rear member (18) disposed in fixed longitudinal relation to said front member, said front member including means for providing contact with a complimentary contact element belonging to another circuit; and

said rear member including means for assuring connection with said wire, said rear member comprising a strip, said strip having a first extremity connected to said front member along said longitudinal axis and a second extremity, said strip having three folds, respectively along a first, a second and a third mutually parallel fold line, to form the shape of a parallelepiped, said fold lines being horizontally



aligned perpendicular to said longitudinal axis, said strip including a horizontal first planar wall disposed at said first extremity and terminating at said first fold, a second planar wall extending between said first fold and said second fold, a third planar wall extending parallel to said first wall between said second fold and said third fold, and a fourth planar wall disposed at said second extremity and terminating at said third fold and first wall, said second and fourth walls having open slots formed therein for receiving, piercing and connecting said wire, an opening being formed in said strip in one of said first and second extremities, and means for closing said parallelepiped, said closing means comprising a tenon projecting from the extremity other than said one of said extremities and capable of penetrating said opening.

4,231,633

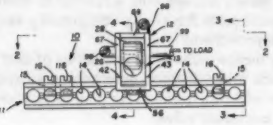
NEUTRAL BAR, LUG AND BARRIER ASSEMBLY

Roger D. Luke, Norcross, and John M. Rhodes, Atlanta, both of Ga., assignors to Gould Inc., Rolling Meadows, Ill.

Filed Sep. 26, 1978, Ser. No. 945,799

Int. Cl.³ H01R 9/10

U.S. Cl. 339—242 **6 Claims**



1. Wiring means including an elongated terminal bar and a terminal connector, a plurality of parallel wire receiving bores extending transversely and sideways through said bar and spaced along the axis thereof, an individual threaded aperture extending from each of said bores to the front of said bar, said apertures normally receiving clamping screws which engage wires disposed in said bores, said connector being selectively positionable along the length of said bar at locations defined by said threaded apertures, a holding screw in threaded engagement with a selected one of said threaded apertures to secure said connector to the front of said bar at the location defined by said selected aperture, a wire receiving recess in said connector, a clamping screw threadably mounted on said connector and extending into said recess to engage a wire therein, said recess being sized to receive a wire substantially larger in diameter than the largest wire receivable by any of the bores, an insulating barrier element mounted on said bar to define a wireway which normally directs wires around the connector, said element including a main section positioned at one side of said bar and extending forward of said connector, said connector including formations operatively positioned in cooperating relationship with additional formations of said element to retain said element mounted to said bar.

4,231,634

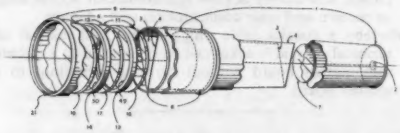
OPTICAL IMAGE MULTIPLYING DEVICE

Jeanne A. Gantz, 1972 El Dorado, Berkeley, Calif. 94707, and David W. Kelso, 3929 Everett Dr., Oakland, Calif. 94602

Continuation-in-part of Ser. No. 838,150, Sep. 30, 1977, Pat. No. 4,162,117. This application May 14, 1979, Ser. No. 39,097

Int. Cl.³ G02B 23/00

U.S. Cl. 350—4.2 **11 Claims**



1. In an optical image multiplying device having a housing, parts of which housing define an aperture, reflecting planes contained within said housing, and an object cell mounted to said housing remote from said aperture wherein light passing between said object cell and said aperture passes between said reflecting planes to produce multiplied images, the improvement comprising:

first and second tumbler objects within said object cell, said objects being capable of rotating and tumbling relative to one another, wherein each object carries a pictorial representation on a first region thereof, wherein said pictorial representation on said first region of said first object includes a light transmitting portion through which details of said pictorial representation of said second object can been seen when viewed through said light transmitting portion, and wherein said first object includes a second light transmitting colored region distinct from said first region.

4,231,635

COMMUNICATION CABLE WITH GLASS FIBER LIGHT WAVEGUIDES

Günter Zeidler, Unterpfaffenhofen, and Ulrich Oestreich, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed May 12, 1978, Ser. No. 905,230

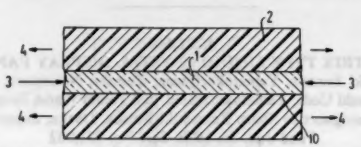
Claims priority, application Fed. Rep. of Germany, May 27, 1977, 2724155

Int. Cl.³ G02B 5/14

U.S. Cl. 350—96.23 **8 Claims**

1. In a communication cable having at least one light waveguide of a glass fiber provided with a close fitting casing, the improvement comprising the casing being of a material with a modulus of elasticity greater then 1500 N/mm², said casing

having a layer thickness of at least 100 μm and a maximum thickness of 1.5 mm, said casing being prestressed in tension to



exert a uniform constant longitudinal compression upon the glass fiber.

4,231,636

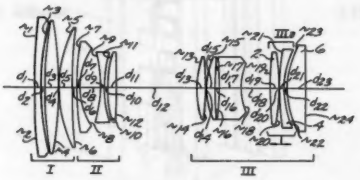
VARIABLE FIELD CURVATURE LENS SYSTEM

Haruo Abe, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 723,888, Sep. 16, 1976, abandoned. This application Jul. 19, 1978, Ser. No. 926,196

Int. Cl.³ G02B *9/16, 15/18*

U.S. Cl. 350—175 FS **9 Claims**



1. In a lens system for the normal transmission of flat images, the improvement of a variable field curvature capability comprising:

at least a first lens element of positive refractive power positioned within the lens system to receive incident optical ray traces of an object at infinity that are approximately parallel with an optical axis of the lens system;

a second lens element of negative refractive power located adjacent the image side of the first lens element; and

a third lens element of positive refractive power located adjacent the image side of the second lens element, the relative refractive powers of the first and second lens elements being designed so that the optical ray traces from the object on the optical axis at infinity are approximately parallel with the optical axis in a space formed between the second and third lens elements, the first and second lens elements being movable as a unit relatively to the third lens elements for changing the field curvature of the lens system without varying the back focal distance of the lens system.

4,231,637

SEVEN-COMPONENT MICROSCOPE OBJECTIVE

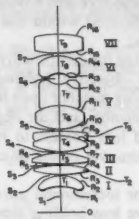
Milton H. Sussman, Amherst, N.Y., assignor to American Optical Corporation, Southbridge, Mass.

Filed Mar. 22, 1979, Ser. No. 23,052

Int. Cl.³ G02B *9/64, 21/02*

U.S. Cl. 350—175 ML **1 Claim**

1. A microscope objective having seven lenses aligned in sequence on an optical axis and that exits parallel light from the last element which comprises the following lens parameters, where radii (R), thicknesses (T) and spacing (S) are in millimeters and numbered sequentially from the object plane, a minus sign (−) denotes a radius having a center of curvature on the object side of the respective lens, and indices of refraction (ND) and Abbe numbers (ν) are absolute values



Lens	Radius (R)	Thickness (T)	Spacing (S)	Refractive Index (ND)	Abbe Number (ν)
			$S_1=4.0$		
	$R_1=-8.000$				
I		$T_1=1.80$		$ND_1=1.564$	$\nu_1=60.80$
	$R_2=-4.515$				
			$S_2=0.2$		
	$R_3=22.933$				
II		$T_2=1.20$		$ND_2=1.487$	$\nu_2=84.46$
	$R_4=-14.370$				
			$S_3=0.2$		
	$R_5=-34.020$				
III		$T_3=1.60$		$ND_3=1.434$	$\nu_3=95.60$
	$R_6=-10.140$				
			$S_4=0.2$		
	$R_7=11.230$				
		$T_4=2.20$		$ND_4=1.434$	$\nu_4=95.60$
IV	$R_8=-8.671$				
		$T_5=0.70$		$ND_5=1.613$	$\nu_5=44.29$
	$R_9=-55.748$				
			$S_5=0.2$		
	$R_{10}=6.290$				
		$T_6=3.50$		$ND_6=1.487$	$\nu_6=84.46$
V	$R_{11}=-8.388$				
		$T_7=3.40$		$ND_7=1.673$	$\nu_7=32.20$
	$R_{12}=2.639$				
			$S_6=1.6$		
	$R_{13}=-2.593$				
VI		$T_8=2.70$		$ND_8=1.54$	$\nu_8=45.75$
	$R_{14}=-5.075$				
			$S_7=0.2$		
	$R_{15}=12.300$				
VII		$T_9=2.95$		$ND_9=1.487$	$\nu=84.46$
	$R_{16}=-20.060$				

4,231,638

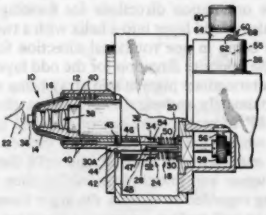
MICROSCOPE OBJECTIVE

Theodore H. Peck, Fairport, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Oct. 20, 1978, Ser. No. 953,230

Int. Cl.³ G02B *7/10, 7/02*

U.S. Cl. 350—255 **10 Claims**



1. An objective for a microscope which comprises:

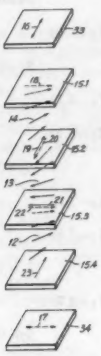
a housing member;
a first tubular objective lens holding member slidably and telescopically disposed within said housing member;
a second tubular objective lens holding member slidably and telescopically disposed within said first tubular objective holding member;
spring loading means for controlledly allowing said first and second tubular objective holding members to recede within said housing member upon impact between the first objective lens member and the object being viewed, and for causing said lens holders to return to their original position upon removal of the object from the objective; and
focusing means for incremental movement of said second tubular objective lens holding member thereby focusing the objective lenses contained therein while maintaining the position of the first objective lens holding member.

4,231,639

POLY-LAYER LIQUID CRYSTAL DISPLAY DEVICE

Syunji Banda, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Nov. 18, 1977, Ser. No. 852,874
Claims priority, application Japan, Nov. 19, 1976, 51-139861
Int. Cl.³ G02F *1/133*
U.S. Cl. 350—335 **4 Claims**



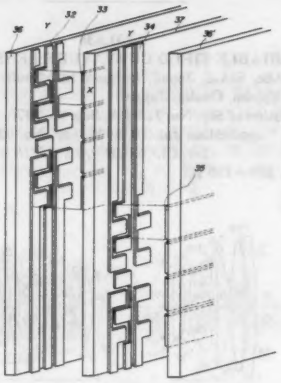
1. A liquid crystal display device, comprising an array of at least three plates, two of said plates being end plates and the remaining plates being intermediate plates, said plates taken in pairs forming cells one less in number than the number of said plates, a layer of nematic liquid crystal material of positive dielectric anisotropy in said cells, opposed surfaces of the pairs of plates having electrode means thereon for forming characters a vector from the bottom to the top of any of said characters defining a reference direction, a polarizing device at the exterior face of each end plate in said array, successive liquid crystal layers being considered alternately even and odd, the two plate faces in contact with each of said liquid crystal layers having surface orientation directions for forming the liquid crystal molecules in said layer into a helix with a twist of about 90°, said twist being in one rotational direction for the even layers and in the opposite direction for the odd layers, the two faces of each intermediate plate in said array being surface-oriented in approximately anti-parallel directions, that is, at approximately 180° to each other, one of said end plates being that through which said device is to be viewed and being termed upper end plate and each of said cells thereby being formed of an upper and lower plate, said surface orientation directions being regarded as vectors, the angle from said reference direction to said surface orientation direction on each of said upper plates being approximately 45° and to said surface orientation direction on each of said lower plates being approximately 135°, said electrodes being connectable to an exterior voltage source.

4,231,640

MATRIX TYPE LIQUID CRYSTAL DISPLAY PANEL

Fumiaki Funada, Yamatokoriyama; Keisaku Nonomura, Nara; Hisashi Uede, Yamatokoriyama, and Tomio Wada, Ikoma, all of, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jun. 30, 1978, Ser. No. 921,062
Claims priority, application Japan, Jul. 7, 1977, 52/81794; Apr. 12, 1978, 53/43430
Int. Cl.² G02F *1/13*
U.S. Cl. 350—336 **5 Claims**



1. An XY matrix liquid crystal display comprising:
a plurality of X electrodes aligned at given spaced intervals in a first direction;
a plurality of Y electrodes aligned at given spaced intervals in a second direction normal to said first direction, adjacent electrode pairs of said plurality of Y electrodes being interleaved with each other to form spaced electrode areas which alternate in said first direction; and
a layer of liquid crystal composition disposed between said plurality of X electrodes and said plurality of Y electrodes;
wherein the dimensions of each of said X electrodes in said first direction is substantially the same as the dimension of two of said interleaved electrode areas in said first direction, each of said X electrodes being superimposed over two of said electrode areas from each of said electrode pairs.

4,231,641

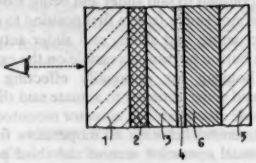
ELECTRO-OPTIC DEVICE

Jean-Paul Randin, Cortaillod, Switzerland, assignor to Ebauches S.A., Neuchatel, Switzerland

Continuation-in-part of Ser. No. 744,943, Nov. 24, 1976, abandoned. This application Sep. 27, 1978, Ser. No. 946,147
Claims priority, application Switzerland, Nov. 29, 1975, 15447/75
Int. Cl.³ G02F *1/01, 1/23*
U.S. Cl. 350—357 **30 Claims**

1. Electro-optic device comprising a transparent conductive layer, an electrochromic layer applied on the said transparent layer, these two first elements constituting together a first electrode, a counter-electrode maintained at distance from the said first electrode, and an electrolyte ensuring an ionic binding between the electrode and the counter-electrode, characterized by the fact that the said electrolyte is made of solid or

pasty organic material constituted by at least a polymer comprising ionic groups of the type used as ion-exchange materials,



the said material of the electrolyte being chemically stable and compatible with that of the electrochromic layer.

4,231,642

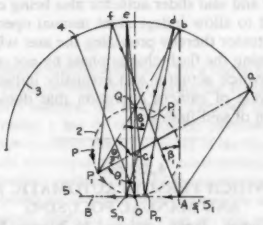
STEREOSCOPIC MOTION PICTURE-CIRCULAR TO LINEAR SCAN TRANSLATOR-METHOD AND APPARATUS

Robert B. Collender, 709 Patterson Ave., Glendale, Calif. 91203

Filed Aug. 1, 1979, Ser. No. 62,749

Int. Cl.³ G03B *35/00*

U.S. Cl. 352—58 **2 Claims**



1. A method of recording and reproducing stereoscopic views for observation by plural observers without visual aids at the eyes of said observers, comprising:

photographing multiple sequential views of a scene from a motion picture camera in a manner such that between each sequential view relative motion takes place between the camera and scene and the optical axis of the camera for the various views is essentially coincident or parallel with each other; reproducing said views sequentially by projecting the views from a scanning projector onto a screen; said scanning projector being positioned, during the projection of successive views, at successive positions about the arc of a projection circle so as to project the images to said screen on the opposite side of said projection circle; said screen being stationary, of larger radius and concentric with said projection circle and comprised of elementary vertical sections having horizontal corrugated ridges to vertically scatter and horizontally reflect incident light rays from said projector, said vertical sections so oriented that the normal line to each vertical section passes through a single reference point, said reference point being located on the opposite side of said projection circle center from said screen and on a line bisecting said screen, said line passing through said projection circle center; said scanning projector constrained to project said sequential views toward a common point located on said bisecting line between said projection circle center and said screen; and the scanning of said projector being at a rate sufficient to be within the period of persistence of vision of an observer.

4,231,643

PHOTOGRAPHIC FILM PROJECTION DISSOLVE SYSTEM FOR ARC LAMP PROJECTORS

Eugene Demick, Ridgewood, N.J., and Adrian J. Van Haasteren, Jr., New York, N.Y., assignors to Bergen Expo Systems, Inc., Clifton, N.J.

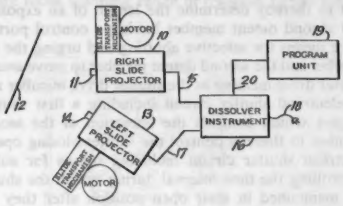
Division of Ser. No. 860,286, Dec. 14, 1977, Pat. No. 4,158,491.

This application Mar. 30, 1979, Ser. No. 25,358

The portion of the term of this patent subsequent to Jun. 19, 1996, has been disclaimed.

Int. Cl.³ G05D *25/00*; G03B *21/14, 23/16*

U.S. Cl. 353—86 **11 Claims**



1. A system for the projection of photographic film comprising:

a plurality of photographic film projectors;

a dissolver instrument connected to said projectors and to a source of a.c. power, said dissolver instrument including power control means to regulate by phase control its average output power to said projectors;

at least one of said projectors having an arc lamp light source and a film gate and a light valve means positioned between said arc lamp and said film gate;

said light valve means attenuating the arc lamp light reaching the film from zero to full intensity and changing such intensity at a controlled rate of speed, said light valve means comprising a motor means connected to said dissolver instrument, said motor means being a rotational motor having a servo feed back loop, the extent of rotation, as distinct from the speed of rotation, of said rotational motor being a function of said average output power, and movement means connected to said motor means and moved thereby at a controlled rate of speed to relatively open, closed and intermediate positions dependent upon the angular position of said rotor means.

4,231,644

ELECTRICAL SHUTTER FOR CAMERA

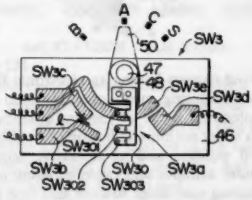
Katsuhiko Tsunefuji, and Isao Kondo, both of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Aug. 16, 1978, Ser. No. 934,084

Claims priority, application Japan, Sep. 30, 1977, 52-117649; Sep. 30, 1977, 52-117650

Int. Cl.³ G03B *7/083, 9/58*

U.S. Cl. 354—51 **17 Claims**



1. An electrical shutter for a camera comprising a shaft, a

prime mover spring for driving said shutter, a charging member which rotates about said shaft in response to a film winding operation to charge said prime mover spring, said shutter having shutter blades movable between an open and a closed position, a shutter drive means for opening or closing the shutter blades by rotating substantially through one revolution under the resilience of said prime mover spring in response to an electromagnetic release operation, a first detent member for maintaining the shutter drive member stationary at a start position before the shutter is operated, a second detent member which is selectively movable between positions engageable with and disengageable from the shutter drive member as the shutter drive member rotates to open the shutter blades for temporarily maintaining the shutter blades in an open condition to thereby determine the length of an exposure period, said second detent member having a control portion; detent drive means for selective abutting and urging the first detent member and the second detent member to move away from the shutter drive member as the shutter drive member rotates, and an electrical shutter circuit including a first shutter release magnet which controls the operation of the second detent member to thereby control the shutter closing operation, the electrical shutter circuit including means for automatically controlling the time interval during which the shutter blades are maintained in their open position after they have been opened by the rotation of the shutter drive member, said detent drive means comprising a driving arm which is adapted to abut against the control portion formed on the second detent member during rotation of the shutter drive member, and

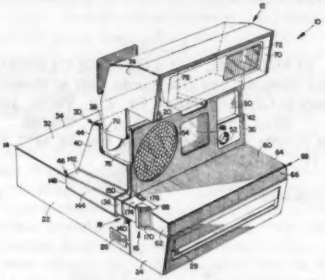
an engagement control member which is disposed adjacent to the control portion of said second detent member and is angularly movable relative to said second detent member, said engagement control member being disposed such that said driving arm initially engages said engagement control member of said second detent member and thereafter engages said control portion, said engagement control member being formed with a beveled surface engageable with said driving arm.

4,231,645

CAMERA WITH TELESCOPING DUAL ACTUATORS

Carl W. Davis, Lynnfield, and Joseph E. Murray, Jr., Malden, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Jul. 3, 1979, Ser. No. 54,652
Int. Cl.³ G03B *15/05, 17/04, 17/38;* H01H *9/26*
U.S. Cl. 354—145 **9 Claims**



1. An improved camera having an electronic flash unit and including a camera housing, means operable upon actuation for initiating an automatic cycle of camera operation including film exposure, a slider within said housing movable between an inoperative first position and an operative second position wherein said slider actuates said cycle initiating means, means for normally biasing said slider toward said first position, and a charge control circuit, responsive to operation of a charge control switch within said camera housing and normally set in a noncharging state, for connecting the flash unit to a source of electrical power to charge the flash unit's storage capacitor so that said flash unit will operate during the automatic cycle of camera operation wherein the improvement comprises:

a slider actuator coupled to said slider and being mounted on said camera for movement from a first position to a second position for actuating said slider, said slider actuator including a push button portion accessible on the exterior of said camera housing for optionally effecting manual movement of said slider actuator to actuate said slider; and

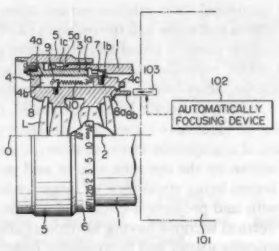
a normally operable charge switch actuator mounted on said camera for movement between an inoperative first position and sequential operative second and third positions, said charge switch actuator including a forward portion having a push button section that is accessible on the exterior of said camera housing for effecting manual movement of said charge switch actuator and a rearward portion extending into said camera housing and including a cam thereon for operating said charge control switch, said charge switch actuator and said slider actuator being cooperatively arranged so that in response to movement of said charge switch actuator from its first to its second position said cam switches said charge control switch to its charging state and in response to further movement from its second to its third position said charge switch actuator engages and moves said slider actuator from its first to its second position to effect sequential operation whereby said flash unit is charged before an automatic cycle of camera operation is initiated, said charge switch actuator and said slider actuator also being cooperatively arranged to allow independent manual operation of said slider actuator thereby providing the user with the option of bypassing the flash charge phase by not operating said charge switch actuator and manually initiating an automatic cycle of camera operation that does not include operation of said flash unit.

4,231,646

CAMERA WHICH PERMITS AUTOMATIC FOCUSING AND MANUAL FOCUSING

Yozo Iida, Komae, Japan, assignor to Nippon Kogaku K.K., Tokoyo, Japan

Filed Jan. 29, 1979, Ser. No. 7,627
Claims priority, application Japan, Jan. 31, 1978, 53-8798
Int. Cl.² G03B *3/00*
U.S. Cl. 354—195 **9 Claims**



1. A camera which permits automatic focusing and manual focusing, comprising:

(1) an objective lens structure including:

(a) a focusing lens system;

(b) a focusing lens system supporting member for supporting said focusing lens system;

(c) biasing means for biasing said lens system supporting member in one direction of the optic axis of said focusing lens system; and

(d) an externally operable, manual focusing operating member for moving said lens system supporting member in said one direction through said biasing means and

for directly moving said lens system supporting member in the opposite direction;

(2) an automatic focusing device; and

(3) actuating means for moving said lens system supporting member in the direction of the optic axis against the biasing force of said biasing means by the output of said automatic focusing device, independently of said manual focusing operating member.

4,231,647

AUTOMATIC FOCUSING CAMERA

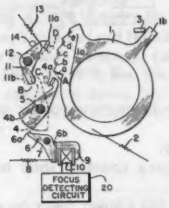
Kiyoshi Kitai, and Yuzuru Takazawa, both of Chiba, Japan, assignors to Seiko Koki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 1, 1979, Ser. No. 8,761

Claims priority, application Japan, Feb. 7, 1978, 53-12702

Int. Cl.³ G03B *3/10*

U.S. Cl. 354—195 **4 Claims**



1. An automatic focusing apparatus for a camera comprising: a movable focusing member for adjusting the focus of a photographic lens of a camera, the focusing member having a cam section comprising a set of cam-shaped portions which are disposed thereon to effect the positioning of the focusing member in positions corresponding to predetermined object distances; first arresting means mounted for movement between a first range of positions in which it is engageable with any one of the cam-shaped portions of the cam section and a second range of positions in which it cannot engage with any cam-shaped portion; second arresting means mounted for movement in response to the movement of the first arresting means into the second range of positions from a rest position wherein it cannot engage with any cam-shaped portions to an operative position wherein it engages a predetermined one of the cam-shaped portions corresponding to a pan-focus; a focus detecting circuit for detecting the object focus distance of an object to be photographed; and electromagnetic means responsive to the detection of the object focus distance for holding the first arresting means in the first range of positions at a position in which it engages the cam-shaped portion corresponding to the detected object focus distance and responsive to the inability of the focus detecting circuit to detect the object focus distance for effecting both the movement of the first arresting means into the second range of positions and the movement of the second arresting means into the operative position to engage the predetermined cam-shaped portion whereby a pan-focus of the lens will be obtained.

4,231,648

AUTOMATIC FOCUSING CAMERA

Kiyoshi Kitai; Tadashi Nakagawa, and Hiroaki Ishida, all of Yotsukaido, Japan, assignors to Seiko Koki Kabushiki Kaisha, Tokyo, Japan

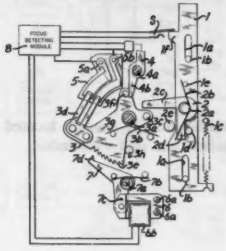
Filed Feb. 1, 1979, Ser. No. 8,762

Claims priority, application Japan, Feb. 7, 1978, 53-12701

Int. Cl.³ G03B *3/10*

U.S. Cl. 354—195 **4 Claims**

1. An automatic focusing apparatus for use in a camera, comprising: an operating member movable from a rest position to a depressed position; an actuating member rotatably mounted on the operating member; a detecting member mounted for movement from a first position to a second position and means biasing same into the first position; means acting on the actuating member for enabling the actuating member to move the detecting member from the first to the second position in response to the movement of the operating member from the rest position to the depressed position and for disengaging the actuating member from the detecting member when the operating member is in the depressed position to enable the detecting member to move from the second position to the first position by the action of the biasing means; a device for producing an electrical signal corresponding to the position of the detecting member; a focus scanning member movable over its entire focus scanning range in response to the move-



ment of the detecting member from its first to its second positions; electromagnetic means responsive to the actuation thereof for stopping the movement of the detecting member during the movement thereof from the second position to the first position; and a focus detecting module receptive of the signal from said device synchronously with the movement of the focus scanning member during the movement of the detecting member to the second position to determine the signal from said device corresponding to the in-focus position and for actuating the electromagnetic means to stop the return movement of the detecting member to its first position when the signal from said device is equal to that determined for the in-focus position.

4,231,649

VIEWFINDER DISPLAY IN A SINGLE LENS REFLEX CAMERA

Makoto Kimura, and Yutaka Iizuka, both of Tokyo, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Continuation-in-part of Ser. No. 949,265, Oct. 6, 1978, abandoned. This application Jun. 4, 1979, Ser. No. 44,975

Claims priority, application Japan, Oct. 8, 1977, 52/134765[U]

Int. Cl.³ G03B *13/02, 17/20*

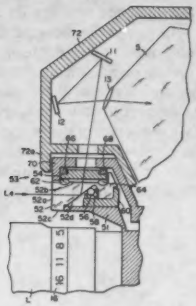
U.S. Cl. 354—224 **9 Claims**

1. A single lens reflex camera body to which a viewfinder system can be removably mounted, comprising:

a projected portion provided in the front face of the camera body between a mounting portion of the camera body on which a photographic lens is mounted and a viewfinder mounted on the camera body; and

display means provided in said projected portion, said display means being capable of being viewed through a viewfinder mounted on the camera body, and wherein

said projected portion includes illumination means for illuminating said display means, and said display means is



a light transmitting display element located between said illumination means and said viewfinder.

4,231,650

BLADE TYPE FOCAL PLANE SHUTTER

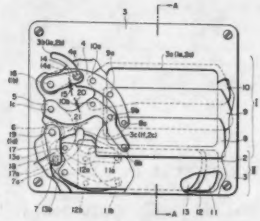
Toshihisa Saito, Tokyo, and Nobuyoshi Inoue, Kawagoe, both of Japan, assignors to Copal Company Limited, Tokyo, Japan

Filed Dec. 14, 1978, Ser. No. 969,413

Claims priority, application Japan, Dec. 15, 1977, 52-168770[U]

Int. Cl.³ G03B *9/40*

U.S. Cl. 354—246 **8 Claims**



1. A blade type focal plane shutter comprising a base plate having an exposure aperture therein, a driving arm rotatably supported at one end on said base plate and able to move between its cocked position and its uncocked position, an auxiliary arm rotatably supported at one end on said base plate at a distance from said driving arm and able to move between its cocked position and its uncocked position, at least one opague thin plate pivotably supported on said driving arm and auxiliary arm and able to open and close said exposure aperture, and a spring connected between said base plate and said auxiliary arm and able to bias said driving arm and auxiliary arm in one direction to absorb backlashes present at respective pivotably supporting points of said driving arm and auxiliary arm with said opague thin plate.

4,231,651

CAMERA BODY

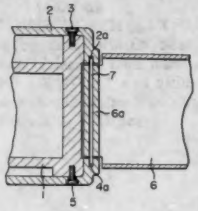
Tomio Tsuruoka, Tokyo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Mar. 28, 1979, Ser. No. 24,677

Claims priority, application Japan, Mar. 29, 1978, 53-39310[U]

Int. Cl.³ G03B *17/02*

U.S. Cl. 354—288 **4 Claims**



1. A camera body having a pivotally mounted back lid, comprising:

(a) an interior body;

(b) a back lid having rotatable shaft means at one end thereof;

(c) an upper cover and a lower cover removably secured to the upper portion and the lower portion, respectively, of the camera's interior body, said covers having integrally formed therewith outwardly extending axially aligned supporting members for supporting said rotatable shaft means of said back lid on the opposed surfaces of the ends of said covers; and

(d) securing means for securing said covers to the camera's interior body;

whereby said back lid may be pivotally mounted in a readily removable manner to the camera's interior body by securing said covers to the camera's interior body by said securing means when said lid shaft means are positioned between said covers.

4,231,652

DRUM FOR ELECTROPHOTOGRAPHIC COPIER

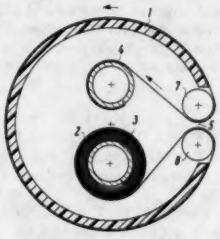
Kurt Moser, and Helmut Wegmann, both of Gerlingen, Fed. Rep. of Germany, assignors to Develop KG Dr. Eisbein & Co., Gerlingen, Fed. Rep. of Germany

Filed Nov. 24, 1978, Ser. No. 963,217

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1977, 2756388

Int. Cl.³ G03G *15/00*

U.S. Cl. 355—3 DR **34 Claims**



1. A drum for an electrophotographic copier, the drum including an interior space, a stock roll means disposed in the interior space for accommodating a supply of weblike photosensitive semiconductor material, a takeup roll means disposed

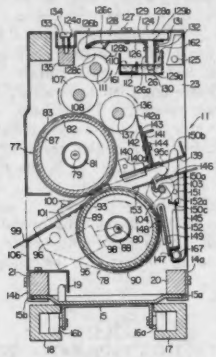
in the interior space for receiving the semiconductor material from said stock roll means, the semiconductor material extends from the stock roll means around an outer peripheral surface of the drum to the takeup roll means, characterized in that at least two deflector roll means are arranged at the drum for defining a slit means for enabling the semiconductor material to be led into and out of the interior space of the drum, the drum including the stock roll means, takeup roll means, and semiconductor material are constructed as an exchangeable unit adapted to be inserted into the electrophotographic copier, and in that quick release means are provided on the drum for connecting the drum to bearing means and a rotary drive means of the electrophotographic copier, said quick release means includes means for accommodating axially adjustable bearing pins arranged at the bearing means and rotary drive means of the electrophotographic copier.

4,231,653

OIL SUPPLY APPARATUS

Yasumori Nagahara, Yokosuka, and Haruki Iida, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Japan

Filed Nov. 28, 1978, Ser. No. 964,381
Claims priority, application Japan, Nov. 30, 1977, 52-144478
Int. Cl.³ G03G *15/00*
U.S. Cl. 355—3 FU **20 Claims**



1. An offset preventing oil supply device for a heat type image fixing apparatus of a copying machine for operation to make copies comprising:

an image fixing roller rotatably mounted in the copying machine;

a pressure roller rotatably mounted in the copy machine engageable in pressure contact with said image fixing roller to fix an image on the copy sheet moved therebetween;

an oil container for containing a replaceable supply of offset preventing oil associated with said image fixing roller, having an oil course defined therein forming a path for the replaceable supply of oil;

oil supply means between said oil container course and said image fixing roller for supplying oil in small quantities and for evenly distributing the oil on said image fixing roller;

an oil tank for containing a supply quantity of offset preventing oil associated with said oil container;

pump means connected between said oil tank and said oil container for drawing oil from said tank and supplying it to said container at one end of said oil course;

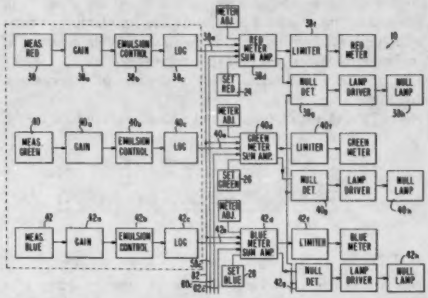
said oil container including a drain at one opposite end of said oil course for draining the oil from said container, whereby a replaceable supply of oil is maintained in said oil container course; said pump means actuated when the copying machine is in operation for providing a flow of the oil in the container to continuously apply the oil in a non-deteriorated state to said image fixing roller through said oil supply means.

4,231,654

CONTROLLER FOR PHOTOGRAPHIC ENLARGER OR THE LIKE

William H. Prickett, Redwood City, Calif., assignor to Michael E. Gorski, Menlo Park, Calif.

Filed Apr. 27, 1979, Ser. No. 34,071
Int. Cl.³ G03B *27/73*
U.S. Cl. 355—38 **10 Claims**



1. Apparatus for controlling a photographic enlarger in accordance with a predetermined set of reference values for color and density with the enlarger having a light source capable of radiating light of different wavelengths comprising: means for sensing a number of different wavelengths of the light from said light source, said sensing means being operable to generate a voltage corresponding to the amount of light of each of said number of wavelengths, respectively; a timer; means coupled with the timer for applying a voltage to the enlarger for energizing the same during a period in which the timer is actuated; means coupled with the timer for adjustably setting the timer to any one of a number of different time periods; a summing device for each of said number of wavelengths, respectively, each device having a number of inputs and an output, each device being operable to provide a null condition at the output thereof when the sum of the input voltages is substantially zero, said sensing means corresponding to each of said number of wavelengths being coupled to one of the inputs of the respective device, said time setting means having means coupling it to another input of each device, respectively; means coupled with a third input of each device, respectively, for applying reference density and wavelength voltages thereto in accordance with said predetermined reference set; and means coupled with the output of each device, respectively, for indicating a null condition of the output thereof.

4,231,655

METHOD OF DYNAMIC REPRESENTATION AND APPARATUS THEREFOR

Klaus M. Schwab, Troinex, Switzerland, and Detlev Kahrbek, Blumenau, Brazil, assignors to International Educational Services AG, Chur, Switzerland

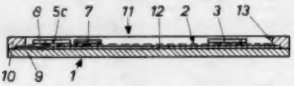
Filed Feb. 27, 1979, Ser. No. 15,669
Claims priority, application Switzerland, Oct. 31, 1978, 11205/78
Int. Cl.³ G03B *27/52*
U.S. Cl. 355—40 **8 Claims**

1. A method of dynamic representation of information which comprises providing a frame having a back comprising a sheet of magnetic metal, a rim fixed to said back and having an opening defining a window, a reference sheet overlying said sheet of magnetic metal and visible through said window, said reference sheet having indicia thereon, placing on said refer-

ence sheet in selected position thereon a plurality of movable members of selected size, shape and color, said movable members having permanent magnetic properties whereby said members when placed in selected position on said reference sheet are attracted by said underlying sheet of magnetic metal and thereby held on said reference sheet in the position in which they are placed, turning said frame with said reference sheet and said movable members thereon face down on the window of a photocopying machine and operating said machine to make a photocopy of said frame with said reference sheet and said movable members thereon, said rim projecting forwardly from said back beyond said movable members on said reference sheet whereby said rim rests on the window of the photocopying machine and holds said movable members out of engagement with said window to avoid displacement of said movable members on said reference sheet.

2. Apparatus for dynamic representation of information comprising:

a frame having a back comprising a sheet of magnetic metal,



a rim fixed to said back and having an opening defining a window,

a reference sheet overlying said sheet of magnetic metal and visible through said windown, said reference sheet having indicia thereon, and

a plurality of movable members of selected size, shape and color, said movable members having permanent magnetic properties whereby said members when placed in selected position on said reference sheet are attracted by said underlying sheet of magnetic metal and thereby held on said reference sheet in the position in which they are placed when said frame is placed face down on the window of a photocopying machine,

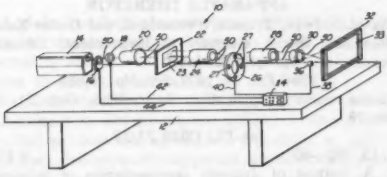
said rim projecting forwardly from said back beyond said movable members on said reference sheet, whereby said rim rests on the window of the photocopying machine and holds said movable members out of engagement with said windown to avoid displacement of said movable members on said reference sheet.

4,231,656

APPARATUS AND METHOD OF CONVERTING AN IMAGE ON A TRANSPARENCY TO LINE ART ON A RECORDING MEDIUM

Fred M. Dickey, Derby; Jerry R. White, and James Crill, both of Wichita, all of Kans., assignors to The Boeing Company, Seattle, Wash.

Filed Mar. 28, 1979, Ser. No. 24,740
Int. Cl.³ G03B 27/72
U.S. Cl. 355—71 **12 Claims**



1. A method of converting an image on a transparency to line art on a recording medium, the steps comprising:

directing a light beam outwardly from a high intensity light source;

illuminating an image on a transparency with the beam;

subjecting the illumination beam to a first fourier transform lens resulting in a spatial frequency distribution of the image in the illumination beam;

filtering the spatial frequency distribution of the image in the beam for removing undesirable spatial frequencies of the image and modification of the amplitude of the remaining spatial frequencies of the image;

reconstructing the filtered image of the beam from the remaining spatial frequencies by subjecting the beam to a second fourier transform lens; and

exposing the reconstructed image of the beam to a recording medium thereby producing line art from the original image on the transparency.

7. An apparatus for converting an image on a transparency to line art on a recording medium, the apparatus comprising:

an optical base;

a high intensity light source disposed on said base, said light source directing a light beam outwardly therefrom;

a transparency holder disposed on said base, said holder holding a transparency with an image thereon, said holder positioned in front of the light beam so that the light beam is directed through the transparency;

a first fourier transform lens disposed on said base and positioned in front of said holder for receiving the beam therethrough;

a filter holder having a filter mounted thereon disposed on said base and positioned in front of said first fourier transform lens, said filter filtering the spatial frequency distribution of the image in the beam for removing undesirable spatial frequencies of the image and modifying the amplitude of the remaining spatial frequencies of the image;

a second fourier transform lens disposed on said base, and positioned in front of said filter for receiving the filtered image of the beam transmitted therethrough and reconstructing the filtered image from the remaining spatial frequencies; and

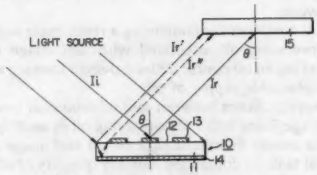
a recording medium holder disposed on said base, and positioned in front of said second lens for exposing the reconstructed image on a recording medium held thereon, thereby producing line art from the original image on the transparency.

4,231,657

LIGHT-REFLECTION TYPE PATTERN FORMING SYSTEM

Seiichi Iwamatsu, Tokyo, Japan, assignor to VLSI Technology Research Association, Japan

Filed Mar. 22, 1979, Ser. No. 22,848
Claims priority, application Japan, Mar. 27, 1978, 53/34157
Int. Cl.³ G03B 27/72
U.S. Cl. 355—71 **15 Claims**



1. A light-reflection type pattern forming system comprising:

a light source producing light along a predetermined path;

a light-reflection substrate having a main surface facing said light source, said substrate including a highly-reflective pattern region made of a material of high light reflection formed in a selected portion of the main surface thereof, and a poorly-reflective pattern region made of a material

of poor light reflection formed in the remainder of the main surface of said substrate to form a predetermined pattern on said substrate, said highly-reflective and poorly-reflective pattern regions being exposed on said main surface and having their surfaces on the same plane, said substrate being disposed on the path of said light source whereby the highly-reflective and poorly-reflective pattern regions are exposed to the light from said light source with a predetermined angle of incidence; and

an object to be exposed, disposed at a distance from the path of said light source and positioned to receive light reflected from said highly-reflective pattern region on the main surface of said substrate.

4,231,658

DEVICE FOR POSITIONING A MASTER COPY-RECEIVING ROLLER OF A FORM PRINTING DEVICE

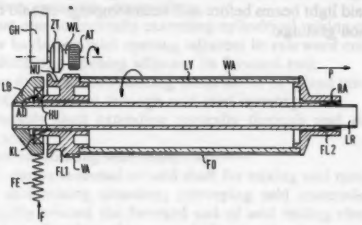
Siegfried Zoeke, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed May 1, 1979, Ser. No. 35,062

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1978, 2826530

Int. Cl.[2] G03B *27/10*

U.S. Cl. 355—110 **11 Claims**



1. In a copying machine apparatus of the type in which a transparent roller is rotatably mounted on a lamp tube, the improvement for accurate axial positioning of the roller comprising:

a drive mechanism including a rotatable drive wheel, and first camming means;

mounting means mounting the lamp tube and said drive mechanism for relative movement toward and away from one another;

a driven wheel carried by the roller for engagement with said drive gear; and

second camming means carried by one of said roller and said tube for interaction with said first camming means to axially align said drive and driven wheels upon relative movement of said drive mechanism and the lamp tube toward each other.

4,231,659

METHOD OF MAKING AN OVERLAY MASK AND A PRINTING PLATE THEREFROM

David J. Logan, Glastonbury, Conn., assignor to The Gerber Scientific Instrument Company, South Windsor, Conn.

Filed Apr. 11, 1979, Ser. No. 29,358

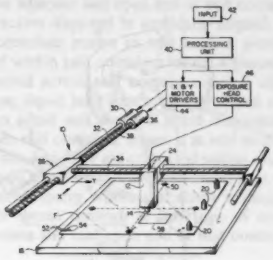
Int. Cl.[3] G03B *41/00*

U.S. Cl. 355—132 **16 Claims**

1. A method of producing a printing plate with an overlay mask comprising:

placing a film having a photosensitive surface in an automatic precisely controlled photoplotter having an optical exposure head with the photosensitive surface of the film disposed for exposure by the head;

controllably moving the exposure head relative to the photosensitive surface of the film with accurate, predetermined motions, and simultaneously exposing the film surface with the exposure head to precisely expose the film in accordance with the pattern of a desired printing plate overlay mask with sharply separated transparent and opaque areas in linear, rectangular or other shapes that divide a plate into prescribed areas for receiving and not receiving printed matter through the mask;



developing the exposed film and producing the precisely exposed overlay mask with a mask pattern in contrasting transparent and opaque areas corresponding to the film exposure; and

photoengraving a printing plate directly by means of the precisely exposed overlay mask for accurate disposition of printing information on the printing plate.

4,231,660

MICROSCOPE SLIDE WITH ELECTRODE ARRANGEMENT FOR CELL STUDY, AND METHOD FOR ITS CONSTRUCTION

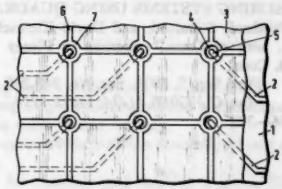
Ernst Remy, Georgenstr. 22, 8000 Munich 40; Andreas Meyer, Herzog-Albrecht-Str. 21, 8011 Zorneding; Ellen Rieske, Thomaweg 12, 8131 Berg II, and Günther Gross, Auerbergstr. 9, 8011 Zorneding, all of Fed. Rep. of Germany

Filed Sep. 14, 1978, Ser. No. 942,305

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1977, 2741638

Int. Cl.[3] G01N *21/01*; G02B *21/34*; B32B *3/10, 3/00*

U.S. Cl. 356—244 **16 Claims**



1. A slide for supporting an electrically contacting cell matter to be observed under a microscope comprising:

a base;

a plurality of electrical conductors disposed on said base; and

an insulating coating applied over said base and said electrical conductors to insulate said cell matter from said electrical conductors; and

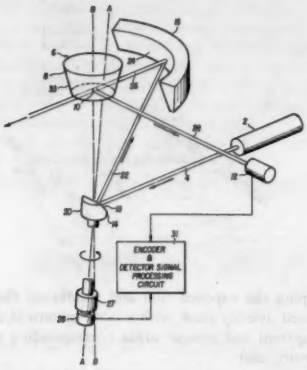
a plurality of microscopic perforations through said insulating coating, each of said perforations communicating with a respective one of said electrical conductors thereby permitting electrical contact to at least one precise area of said cell matter by stimulation of the respective electrical conductor.

4,231,661

RADIAL SCANNER

J. William Walsh, Baltimore, Md., and Raymond E. Bietry, Jr., Lake Shawnee, N.J., assignors to Becton, Dickinson & Company, East Rutherford, N.J.

Filed Sep. 20, 1978, Ser. No. 944,179
Int. Cl.³ G01N *21/01*
U.S. Cl. 356—340 **12 Claims**



1. A radial scanner comprising:

a source of a beam of radiant energy;

a means for deflecting the beam of radiant energy, said deflecting means being located on a reference axis;

means for rotating the deflecting means to thereby sweep the deflected beam; and

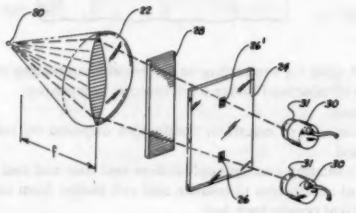
means, having a planar surface curved about the reference axis for reflecting the swept, deflected beam; whereby a beam reflected by the reflecting means radially scans a test sample container located on the reference axis and displaced from said deflecting means, said scanning being affected through a range of angles lying in substantially the same plane.

4,231,662

PHASE SHIFT CORRECTION FOR DISPLACEMENT MEASURING SYSTEMS USING QUADRATURE

Seymour Feinland, Stamford, and David Kleinschmitt, South Norwalk, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Sep. 7, 1978, Ser. No. 940,265
Int. Cl.³ G01B *11/14*; H01J *3/14*
U.S. Cl. 356—373 **5 Claims**



1. In a displacement measuring system, apparatus for producing variable gray level patterns, and adjusting the angle phase difference of transmitted light producing said patterns, the combination comprising:

(a) a small area light source for providing a source of light beams;

(b) an index diffraction grating with at least two windows in substantial quadrature with respect to each other and disposed adjacent said light source for receiving light beams from said light source;

(c) an extended diffraction grating adjacent to, and substantially parallel with, said index diffraction grating, and intermediate said light source and said index diffraction grating, said extended diffraction grating being capable of relative motion with respect to said index diffraction grating to coact with said index diffraction grating to produce a gray level pattern for each of said two windows when said light beams impinge on said index diffraction grating;

(d) photodetector means for receiving said gray level pattern produced by said diffraction gratings and in response thereto, producing electrical output signals which vary in phase with said gray level pattern in accordance with any relative movement between said extended diffraction grating and said index diffraction grating; and

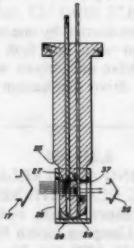
(e) refraction means disposed intermediate said light source and said diffraction gratings for refracting said light beams before they impinge on said diffraction gratings, said refraction means being movably disposed between said light source and said diffraction gratings for refracting said light beams before said beams impinge on said diffraction gratings.

4,231,663

DEVICE FOR CALIBRATING THE PHOTOMETRIC LINEARITY OF OPTICAL INSTRUMENTS

Conrad M. Phillippi, 7420 Brantford Rd., Dayton, Ohio 45414

Filed Mar. 16, 1979, Ser. No. 21,142
Int. Cl.³ G01N *21/01*
U.S. Cl. 356—432 **4 Claims**



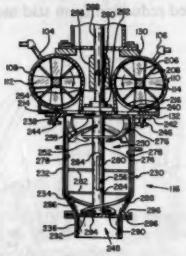
1. A device for calibrating the photometric linearity of optical instruments which transmit a light beam through the sample being analyzed, which comprises a variable attenuator which can be inserted into the path of said light beam, and when so inserted completely obstructs an area segment of said beam without altering the remainder of the beam area, and an accurate step attenuator of fixed value, capable of being inserted into and removed from the path of the beam segment not obstructed by said variable attenuator.

4,231,664

METHOD AND APPARATUS FOR COMBINING HIGH SPEED HORIZONTAL AND HIGH SPEED VERTICAL CONTINUOUS MIXING OF CHEMICALLY BONDED FOUNDRY SAND

Steven D. Flock, Beaverton, and Roger A. Hayes, Tigard, both of Oreg., assignors to Dependable-Fordath, Inc., Sherwood, Oreg.

Filed Mar. 21, 1979, Ser. No. 22,609
Int. Cl.³ B01F 7/04, 7/08, 7/24
U.S. Cl. 366—35 8 Claims



2. Mixer apparatus, comprising:

at least one horizontally extending cylindrical mixing chamber having an inlet opening adjacent its rearward end and a discharge opening adjacent its forward end;

feeder means for introducing materials to be mixed into said mixing chamber through said inlet opening;

a rotatable shaft extending centrally through said mixing chamber;

means for rotating said shaft; and

blade means mounted on said shaft for mixing said materials in said mixing chamber, conveying said materials forwardly toward the forward end of said mixing chamber and discharging said materials from said mixing chamber through said discharge opening therein,

said blade means comprising

helical blades mounted on said shaft adjacent said inlet opening for conveying said materials forwardly,

a plurality of fixed similarly pitched paddle blades mounted on said shaft forwardly of said helical blades for mixing said materials and conveying the same forwardly, and

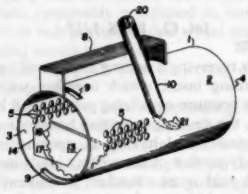
a plurality of radially extending flinger blades mounted on said shaft forwardly of said paddle blades and adjacent said discharge opening for discharging said materials through said discharge opening.

4,231,665

FILTER AID DISPENSING ARRANGEMENT

Winston L. Shelton, P.O. Box 9922, Chenoweth Run Rd., Jeffersontown, Ky. 40299

Filed Oct. 17, 1979, Ser. No. 85,482
Int. Cl.³ B01F 5/04; B67D 5/54
U.S. Cl. 366—165 5 Claims



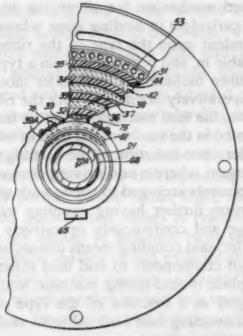
1. A filter aid dispensing device including: container means having sidewall means defining an open end to receive powdered filter aid and a closed end; aperture means located at selected locations in said sidewall means in spaced relation from said closed end to allow excess powdered filter aid to flow out of said container means when a predetermined quantity of powdered filter aid is accumulated in said container means when said container means is in first position; handle means to position said container means in first and second positions; slot means in transversly aligned relation in said sidewall means adjacent said open end of said container means to receive brackets disposed in vertically aligned relation to secure said container means in said second position; baffle means located within said container means adjacent said open end and disposed across said container means adjacent said sidewall means; liquid inlet tube means provided in said sidewall means to admit and direct a liquid tangentially to said container when said container means is in said second position to throughly mix said filter aid contained within said container means and liquid admitted through said liquid inlet tube means to form a precoat slurry where said slurry is dispensed from said container means through at least one of said aperture means, slot means and said open end of said container means.

4,231,666

MIXING APPARATUS

John Baron, Accrington, England, assignor to E. T. Oakes Limited, Macclesfield, England

Filed Mar. 7, 1979, Ser. No. 18,102
Claims priority, application United Kingdom, Mar. 10, 1978, 9674/78
Int. Cl.³ B01F 5/06, 7/00
U.S. Cl. 366—304 15 Claims



1. A mixing device comprising, in combination:

(a) a housing of generally cylindrical construction;

(b) two end walls to said housing;

(c) a shaft mounted for rotation coaxially of said cylindrical housing;

(d) means for rotating said shaft in a given direction of rotaton;

(e) a fluid inlet and a fluid outlet to said housing;

(f) means for feeding fluid to be mixed under pressure to said fluid inlet;

(g) concentric arrays of axially extending mixing elements on at least one end wall;

(h) a rotor mounted on said shaft for rotation therewith, said rotor having an end face facing said at least one end wall;

(i) further axially extending mixing elements in a plurality of annular concentric arrays on said rotor, the mixing elements of the rotor and the at least one end wall interfitting with one another, and the mixing elements of each array on said at least one end wall and said rotor each being defined by inner and outer part-cylindrical surfaces and by further straight surfaces forming the sides of grooves, the axes of which are disposed along different tangents to an

inner pitch circle which is concentric with said part-cylindrical surfaces such that, upon rotation of said shaft in said given direction, a reverse pumping action is produced tending to resist the feeding of the fluid through the housing by the feeding means.

4,231,667

TYPEWRITER RIBBON FEED MECHANISM

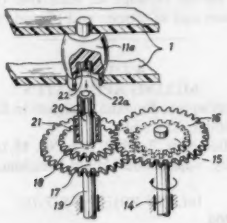
Wolfgang Behrendt; Detlef Bohnhage, both of Wilhelmshaven; Peter Friedemann, Zetel; Bernhard Frölich, Spangenberg, and Reinhold Orzessek, Schortens, all of Fed. Rep. of Germany, assignors to Olympia Werke AG, Wilhelmshaven, Fed. Rep. of Germany

Filed Mar. 5, 1979, Ser. No. 17,541

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1978, 2810768

Int. Cl.³ B41J *33/14*

U.S. Cl. 400—208 **8 Claims**



1. In a feed mechanism for advancing an ink ribbon, supported in a cartridge, in feeding steps whose length is determined dependent upon the type of the ribbon; the cartridge being insertable in, and removable from a typing machine; the feed machanism including a feed roller mounted in the cartridge and operatively connected with the ribbon for advancing the ribbon; the feed mechanism further including a driving device mounted in the machine and operatively connectable to the feed roller upon insertion of the cartridge in the machine; the improvement wherein said driving device has at least two output components arranged to rotate with unlike speeds; said feed mechanism further having coupling means mounted in said cartridge and continuously operatively connected with said feed roller; said coupling means connecting a selected one of said output components to said feed roller when said cartridge is in place in said typing machine; said coupling means being arranged as a function of the type of the associated ribbon for connecting said feed roller to said selected one of said output components.

4,231,668

LIQUID POWER DRIVEN COATING APPARATUS

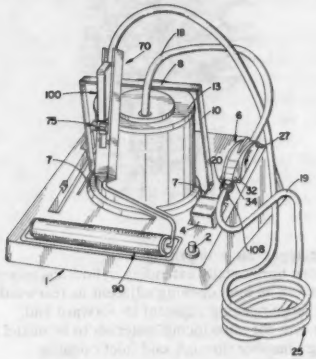
Hugh F. Groth; John D. Vogel, and Guilbert M. Hunt, all of Brecksville, Ohio, assignors to The Sherwin-Williams Company, Cleveland, Ohio

Filed Oct. 5, 1978, Ser. No. 948,912

Int. Cl.³ B43K *5/02*

U.S. Cl. 401—146 **6 Claims**

1. Apparatus for applying a liquid coating to coatable surfaces comprising: a base; means on said base for providing cooperative support between said base and a reservoir of liquid coating material; a peristaltic pump mounted on said base, said pump having entrance and exit ports; an elongated flexible conduit having a portion thereof extending through said pump between said entrance and exit ports; said conduit outside of said entrance port being connectable in liquid transfer relationship with a liquid coating reservoir cooperatively positioned with said support; said conduit beyond said exit port being connected with applicator means for applying liquid coating material to a surface, said applicator means having a handle through which said conduit extends, a selectively operable trigger in said handle for selectively and variably constricting said conduit; said pump including a rotatable rotor assembly having a plurality of rotatable impeller rotors and an arcuate pump stator extending between said entrance and exit ports outwardly of said rotor assembly; said conduit between said entrance and exit ports being positioned beneath said stator and rotor assembly for being progressively squeezed by said rotors during rotation of said rotor assembly to pump liquid coating material to said applicator means; a motor for rotatably driving said rotor assembly and having a motor drive shaft; an epicyclic planetary gear train having an output shaft and being drivingly engaged with said motor drive shaft for providing a first substantial speed reduction from said motor drive shaft to



said output shaft; said output shaft having a diameter substantially smaller than the diameter of said rotors and being drivingly engaged with said rotors for rotating same about their own axes while engaged with said conduit for rotating said rotor assembly; said output shaft, rotors and rotor assembly being sized for providing one rotation of said rotor assembly from a substantial number of rotations of said output shaft to define a second substantial speed reduction from said output shaft to said rotor assembly; said first and second speed reductions providing a combined substantial speed reduction from said motor drive shaft to said rotor assembly; and, said pump including an automatic flow rate modification control responsive to variable back pressure in said conduit downstream of said exit port caused by selective operation of said trigger.

4,231,669

DEVICE FOR RECEIVING A WRITING IMPLEMENT

Rudolf Rosbiegalle, Geroldsgruen; Karl Färber, Steinbach; Herbert Grimm; Helmut Schmeisser, both of Geroldsgruen; Hermann Schönhut, Stein; Svatopluk Krumnikl, Nuremberg, and Günter Edel, Fürth, all of Fed. Rep. of Germany, assignors to A.W. Faber-Castell, Stein bei Nuremberg, Fed. Rep. of Germany

Filed Dec. 4, 1978, Ser. No. 965,918

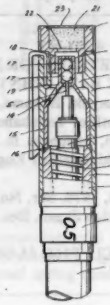
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1977, 2756505

Int. Cl.³ B43K *5/12*

U.S. Cl. 401—258 **16 Claims**

1. A device for receiving a writing implement having a body portion, and writing insert which together with said body portion bounds a pressure-equalizing passage and has a tubular writing member, the device comprising housing means bounding an inner chamber and having an opening arranged for receiving the body portion of the writing implement and communicating with said inner chamber; a resiliently yieldable sealing member is said inner chamber of said housing means and located so that the tubular writing member sealingly abuts against said sealing member; and a wetting member in said housing means and having at least one surface which dis-

charges a wetting medium, said surface of said wetting member being spaced from and in communication with the pressure-equalizing passage of the writing implement when the latter is inserted in the device, so that a zone of wet air is generated in



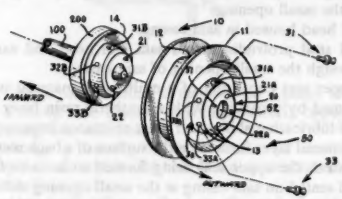
the region of said pressure-equalizing passage whereby drying of a writing liquid in the latter is prevented, but at the same time the tubular writing member is sealed by said resiliently yieldable sealing member from wet air thereby dilution of the writing liquid in the writing tubular member is prevented.

4,231,670

EASY CHANGE WHEEL ASSEMBLY

Jerry L. Knoski, 1695 Emerald Ct., Newark, Ohio 43055

Filed Mar. 14, 1979, Ser. No. 20,302
Int. Cl.[3] F16D *1/00*
U.S. Cl. 403—11 **4 Claims**



1. A wheel assembly, for use in combination with an axle, comprising:

a. a wheel member having an inner hollow hub portion and an outer protruding hub portion;

b. a hub member configurated and dimensioned to fit into and complement with said inner hollow hub portion of said wheel member, with said hub member connected, for rotatable motion, to an axle;

c. means for guiding said hub portions of said wheel member over and onto said hub member, with said hub member guided into, removably positioned in, and abutting said inner hollow hub portion of said wheel member, wherein said guiding means includes:

(1) a plurality of guide pins projecting outwardly from said hub member;

(2) and, a plurality of corresponding complementary guide pin holes, with one said hole for each said guide pin, and with said guide pin holes disposed in and through said outer protruding hub portion of said wheel member, and into which said guide pin holes are inserted said guide pins;

d. means for releasably connecting said wheel member and said hub member, wherein this releasable connecting means includes:

(1) a plurality of snap/lock pins, wherein each one of said plurality of snap/lock pins comprises:

(a) a hollow, essentially cylinder-shaped member having a cylindrical surface with a plurality of holes therein, a closed base end, and an open base end;

(b) a spring disposed within said hollow, cylinder-shaped member, with said spring abutting said closed base end of said hollow, cylinder-shaped member;

(c) a center shaft disposed within said hollow, cylinder-shaped member and having a first end, a second end, and a body portion therebetween with a plurality of hemispherically-configurated cavities therein, with one each of said cavities for a corresponding each one of said holes in said cylindrical surface of said cylinder-shaped member, and with each one of said plurality of hemispherically-configurated cavities disposed rearward of its corresponding hole in said cylindrical surface of said cylinder-shaped member, and also with said center shaft so disposed that it abuts said spring with its first end and also simultaneously abuts said cylinder-shaped member with its body portion;

(d) a plurality of ball bearings, with one ball bearing for each hole in said cylindrical surface of said cylinder-shaped member, selectively capturable within, and between, said holes in said cylindrical surface of said cylinder-shaped member and said corresponding cavities in said body portion of said center shaft;

(e) a push button means for selectively urging and moving said center shaft slidably forward and rearward within said cylinder-shaped member, with this push button means disposed at the second end of said center shaft, and in contact therewith, wherein this push button means includes a push button actuating member, whereby when said center shaft is selectively urged and moved slidably forward of said push button actuating member, said plurality of ball bearings are releasably captured within and between said holes in said cylindrical surface of said cylinder-shaped member and said corresponding cavities in said body portion of said center shaft, and whereby when said push button means is released said ball bearings are caused to protrude from said holes in said cylindrical surface of said cylinder-shaped member, and thereby also causing said snap/lock pin to lock said wheel member to said hub member;

(f) and, means for grasping and holding said snap/lock pin, with this grasping and holding means integrated with said cylinder-shaped member, whereby said snap/lock pin may be grasped, held, and removably inserted into its respective and corresponding hole both in said first plurality of snap/lock pin holes in a outer protruding hub portion of said wheel member, and also in a second plurality of snap/lock pin holes in said hub member;

(2) said first plurality of corresponding complementing snap/lock pin holes being such that each hole receives one of said snap/lock pins in said outer protruding hub portion of said wheel member;

(3) and, said second plurality of corresponding complementary snap/lock pin holes being such that each hole receives one of said snap/lock pins in said hub member, wherein said first and second plurality of holes are in registration;

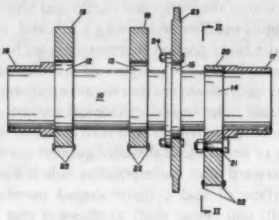
e. and, means for breaking a seal that may develop, between said inner hollow hub portion of said wheel member and said abutting hub member, as a result of releasably connecting said wheel member and said hub member with said releasable connecting means.

4,231,671

ECCENTRIC SHAFT AND METHOD OF MAKING A SHAFT

James E. Makins, Jr., Dallas, Tex., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Nov. 6, 1978, Ser. No. 958,458
Int. Cl.³ F16B *3/00*
U.S. Cl. 403—13 **3 Claims**



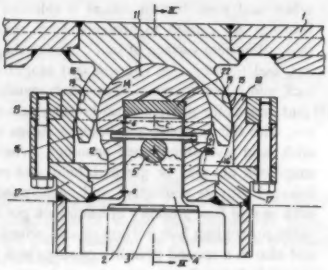
1. An eccentric shaft comprising an elongated cylindrical body, at least one small eccentric disc extending radially from said body, at least one concentric gear flange extending radially from said body, said body, disc and flange being formed as a single integral forging, and a relatively large eccentric disc shrink-fitted and keyed to said small disc, the diameters of said discs being related that the center of said large disc describes a crank circle entirely within said small disc on rotation of said shaft.

4,231,672

HEAVY DUTY ADJUSTABLE PROP WITH A BALL-AND-SOCKET JOINT

Guy Blanpain, Verneuil.En.Halatte, and Pierre Grandfils, Precy-sur-Oise, both of France, assignors to Charbonnages de France, Paris, France

Filed Jun. 25, 1979, Ser. No. 52,013
Claims priority, application France, Jun. 29, 1978, 78 19460
Int. Cl.³ F16C *11/00*
U.S. Cl. 403—62 **9 Claims**



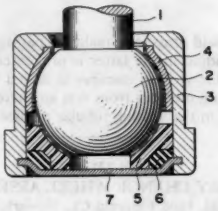
1. A ball joint for transmitting supporting and tractive forces between a prop and a head-piece of a support unit, the ball joint comprising a support element arranged to be carried by a prop and having a spherical head, and a cooperating element arranged to be fastened to a head-piece, the cooperating element being in the form of a skirt-shaped dome and having an internal spherical concave surface extending over a hemisphere at maximum and an external spherical convex surface concentric to said internal surface, the internal surface of the dome having a shape which corresponds to that of the head and cooperating with said head, the support element having a support surface spaced from the head and having a spherical shape corresponding to that of the head, said dome being received in the space between the support surface and the head and the support surface surrounding and bearing against the external surface of the dome, wherein the support element has a cylindrical cavity located within the spherical head and a pivot is mounted with radial clearance within the cylindrical cavity, the pivot being arranged to be carried by the prop.

4,231,673

BALL JOINT AND A METHOD FOR MANUFACTURING THE BALL JOINT

Eiji Satoh, Fujisawa; Masayuki Kohama, Shiga; Kunihiko Yokoya; Kenji Yamada, both of Yokohama, and Akira Nemoto, Toyohashi, all of Japan, assignors to Oiles Industries Co., Ltd., Tokyo and Musashi Seimitsu Kogyo Kabushiki Kaisha, Aichi, both of, Japan

Filed Dec. 18, 1978, Ser. No. 970,170
Claims priority, application Japan, Dec. 28, 1977, 52/158456; Dec. 28, 1977, 52/158457
Int. Cl.² F16C *11/06*
U.S. Cl. 403—125 **8 Claims**



6. A ball joint comprising:
a casing having a small opening and a large opening opposite to the small opening;
a ball head housed in said casing;
a ball stud protruding from said ball head and extending through the small opening of said casing;
an upper seat consisting of a multi-layer material which is formed by providing with a synthetic resin layer having self-lubricating ability and wear resistance impregnated in a sintered layer formed on the surface of a back metal such as steel, the upper seat being formed so as to be fitted in and seated on said casing at the small opening side of said casing, and so as to fit and surround said ball head at its periphery adjacent to the ball stud;
a lower seat consisting of a synthetic resin having self-lubricating ability and abrasion resistance and being formed so as to fit and surround said ball head at its opposite periphery adjacent to the ball stud; and
a closure plate for closing said large opening of the casing;
wherein the upper seat has a spherical surface portion and a cylindrical surface portion extending toward the large opening and with its terminal cylindrical surface spaced from the surface of the ball continuing to this spherical surface portion, and the ball joint is constituted so as to enable the upper seat and lower seat to support a load securely against the casing and ball head when a tensile load is applied to the ball stud.

4,231,674

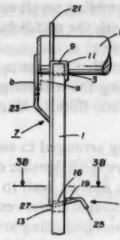
CLIP FOR ATTACHING GUIDE RAILS TO A FRAME

Henry E. Smith, Pleasanton, Canada, assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 28, 1979, Ser. No. 24,806
Int. Cl.³ B25G *3/00*; F16B *7/08*
U.S. Cl. 403—233 **2 Claims**

1. A clip for attaching a guide rail to a guide rail support member characterized in that said clip includes hanger means and first spring means for holding said clip on a guide rail

support member by spring tension between said hanger means and said first spring means, said clip further including a second



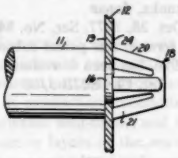
spring member for preventing axial movement of a guide rail and retention means for retaining a guide rail in said clip and in contact with said second spring means.

4,231,675

MOUNTING DEVICE

Milton V. Scozzafava, 17835 Contador Dr., Rowland Heights, Calif. 91748

Filed Apr. 12, 1979, Ser. No. 29,489
Int. Cl.³ B25G *3/00*; F16B *9/00*
U.S. Cl. 403—252 **5 Claims**



1. A device for mounting a member on a plate, said plate having a round hole therein with diametrically opposed notches opening into said hole,

comprising: a bearing integral with said member and adapted to fit within said hole for rotation about the axis of said hole,

a head projecting forwardly from the end of said bearing opposite said member,

two spring arms integral with said head at their forward ends,

said member, bearing, head, and arms being unyielding in an axial direction,

said arms diverging outwardly and rearwardly,

said arms being adapted to pass through said notches, the distance between the rear ends of said arms and said member being less than the thickness of said plate, and

said arms being adapted to flex in a circumferential direction when said bearing is fitted in said hole and said member is subsequently rotated relative to said plate whereby to enable said arms to move out of said notches and to press said member against said plate.

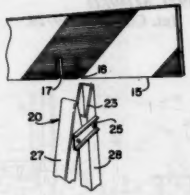
4,231,676

COLLAPSIBLE TRAFFIC BARRICADE

Dennis W. Smith, and Paul J. Mazzacano, both of Joliet, Ill., assignors to F F Fabricators, Inc., Joliet, Ill.

Filed May 21, 1979, Ser. No. 40,494
Int. Cl.³ E01F *13/00*
U.S. Cl. 404—6 **6 Claims**

1. A collapsible traffic barricade assembly for the control of traffic, the identification of traffic lanes and the like, having a center panel with opposing end portions and two supporting leg assemblies, at least one slot formed of a certain width in each end portion of said center panel, each of said slots extending inward from a lower edge of said center panel, each of said supporting leg assemblies comprising two leg members, said leg members being joined by a bracket at an upper end, said bracket having a certain maximum thickness, said maximum thickness being equal to or slightly less than said certain slot width, said bracket being attached to each leg member for pivotal movement of each of said leg members, said bracket spacing said leg members from one another to allow insertion



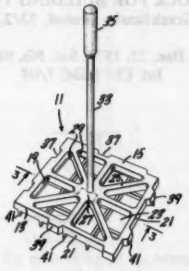
of said bracket into said slot whereby said center panel is supported by said leg assemblies in a substantially horizontal manner, the lower ends of said leg members being spread to bias said upper end against said center panel, whereby the substantial equivalency in size of said slot and said bracket thickness in combination with the bias of said upper end against the center panel contributes to great lateral stability while said barricade assembly is easily collapsible and said leg members are capable of pivoting to a substantially flat position on collision or disassembly.

4,231,677

PROCESS AND APPARATUS FOR FORMING CONCRETE

Derek Roming, Carmel, N.Y., assignor to International Design Systems, Ltd., Fairfield, Conn.

Filed Aug. 28, 1978, Ser. No. 937,125
Int. Cl.² E01C *23/02*
U.S. Cl. 404—89 **6 Claims**



1. A lightweight embossing tool for patterning an impressionable surface material comprising a rectangular weight-supporting platform formed with weight-distributing means and having an essentially flat top, bottom and side portions, a centrally located opening formed on the top surface thereof and adapted to receive a shaft, said platform having dimensions of not less than twelve inches by twelve inches or greater than eighteen inches by eighteen inches; the bottom surface of said platform having rigidly connected thereto a plurality of blades arranged within the perimeter of the bottom of said platform in a predetermined pattern, whereby the bottom of the platform portion limits the depth to which the blades penetrate the

impressionable surface, the total number of lineal inches of blade being between thirty and one hundred and fifty.

4,231,678

PAVING MACHINES

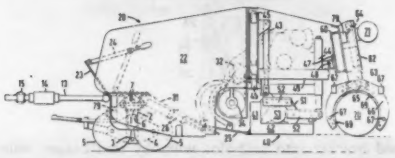
Frederick A. Carternock, Dover, England, assignor to Integrated Technology Limited, St. Peter Port, Guernsey, Channel Islands

Filed May 16, 1978, Ser. No. 907,091

Claims priority, application United Kingdom, May 17, 1977, 20666/77; Aug. 4, 1977, 32740/77

Int. Cl.² E01C *19/28*

U.S. Cl. 404—103 **10 Claims**



1. A road surfacing machine arranged for movement along a road to be surfaced, the machine comprising a body including a hopper for storing material to be laid and outlet means for allowing the discharging of the material from the hopper, a front support and a rear support arranged to support the machine, the front support being situated to travel on the uneven ground to be surfaced, the rear support being situated to travel on the surface laid by the machine, metering means, positioned between the front and rear supports for forming a layer of selected thickness and shape of the material discharged from the outlet means, first bearing means on the front support for free relative angular displacement between the front support and the rest of the machine about a longitudinal axis contained in or parallel to a vertical plane of symmetry of the machine, and second bearing means on the front support for free relative angular displacement between the front support and the rest of the machine about a transverse axis perpendicular to the vertical plane of symmetry of the machine.

4,231,679

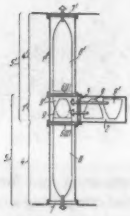
DRY DOCK FOR BUILDING VESSELS

Jury P. Ivanov, Grazhdansky proezd, 92/2, kv. 1, Leningrad, U.S.S.R.

Filed Dec. 12, 1978, Ser. No. 968,856

Int. Cl.² B63C *1/08*

U.S. Cl. 405—4 **3 Claims**



1. A dry dock for building vessels including an aft end, a middlebody and a fore end, comprising:

a main chamber having two ends at, least one of the ends being openable to a water area;

a separating gate positionable in said main chamber for dividing it into an assembly area and a completion and launching area, a middlebody of a vessel being assembled with a fore end in said assembly area, and the same vessel being completed in and launched from said completion and launching area;

at least one side chamber extending perpendicular to said main chamber for assembling an aft end of the vessel, the aft end being joined with the middlebody in said completion and launching area;

an intermediate gate installed between said side and main chambers for separating them from one another so that said side chamber is not flooded during launching of a vessel;

said separating gate being arranged in said main chamber in such a manner as to form an extension of a wall of said side chamber, which is the nearest wall to said assembly area of said main chamber, so that a first vessel can be launched from said completion and launching area without flooding said assembly area whereby a middlebody and a fore end of a second vessel can be assembled in said assembly area while said completion and launching area is flooded.

4,231,680

BREAKWATERS

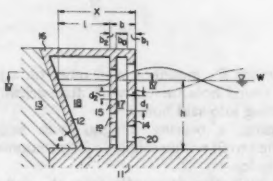
Takeshi Ijima, Fukuoka, Japan, assignor to Iida Kensetsu Kabushiki Kaisha, Fukuoka, Japan

Filed Oct. 28, 1977, Ser. No. 846,388

The portion of the term of this patent subsequent to May 15, 1996, has been disclaimed.

Int. Cl.² E02B *3/06*

U.S. Cl. 405—31 **16 Claims**



1. A double breakwater of the semisubmerged type comprising a base on the water bottom; a back wall of generally planar configuration inclined substantially uniformly over its entire length and inclining away from the incident wave direction, so that its upper part is farther from the incident wave direction than its lower part, and the upper part of said inclined back wall rises above the calm water level; its lower part being below the calm water level; a perforated barrier wall structure having a plurality of apertures or holes standing on the base, which has the same height as the inclined back wall; and a top wall support slab which projects horizontally from the top end of the inclined back wall and which is connected to the top of said perforated barrier wall structure, so as to form and completely cover a chamber between said base and said top, and said perforated barrier wall structure and said inclined back wall, and said chamber is adapted to partly retain at all times some of the water entering said chamber so as to aid in damping wave action; whereby said double breakwater exhibits substantially uniform blocking ability against a variety of waves having a broad range of wave length with the wave energy partly dissipated into vortices generated at said apertures or holes in said wall structure and also further partly converted into vortices generated when the water rushes against said inclined back wall.

4,231,681

STRUCTURE FOR SEA-BED EXPLOITATION ALLOWING THE VARIOUS FUNCTIONS INHERENT IN SUCH EXPLOITATION TO BE PERFORMED

Samuel Tuson, Mesnil-le-Roi, France, assignor to Entreprise d'Equipements Mecaniques et Hydrauliques E.M.H., France

Filed Sep. 11, 1978, Ser. No. 940,998
Claims priority, application France, Sep. 23, 1977, 77 28800
Int. Cl.[2] E21B *43/01, 7/12*
U.S. Cl. 405—195 **19 Claims**

1. A structure for sea-bed exploitation allowing various functions of such exploitation to be performed in connection with well-heads clustered into at least one group in the sea-bed, such, for example, as production, reconditioning and maintenance of said underwater well-heads, and water or gas injection into the productive layers of the sea-bed, said structure comprising: at least one articulated emergent column having a body with a submerged and an emerging portion, said column being adapted to perform at least one of said functions and having associated therewith intervention or servicing means, such as a movable tool, adapted to be vertically alignable over to provide access to each of said well-heads, said intervention or servicing means being secured to and jointly movable with a support, said support being pivotally connected to a carriage, said carriage being movably mounted along guide-rails mounted adjacent to the horizontal apparent contour of the body of the said column.

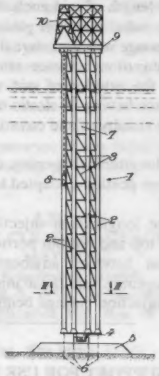
4,231,682

DEVICE FOR HANDLING APPLIANCES ON A SEA BED

Samuel Tuson, Mesnil-le-Roi, France, assignor to Entreprise d'Equipements Mecaniques et Hydrauliques E.M.H., France

Filed Jan. 10, 1978, Ser. No. 868,300
Claims priority, application France, Jan. 17, 1977, 77 01241
Int. Cl.[2] E02B *17/00*
U.S. Cl. 405—202 **3 Claims**

1. An articulated column structure having a longitudinally extending axis adapted to be pivotally connected to an underwater base member anchored to the sea bed and adapted for the handling and maintenance of well heads in off-shore oil fields or the like, said column structure comprising: a head portion defining a top deck of said column structure; a bottom portion adapted to be pivotally connected to said base member anchored to the sea bed; a plurality of pillar members interconnecting said head portion and said bottom portion extending substantially parallel to the axis of said column structure; at least one tubular member mounted for rotation around said longitudinally extending axis adapted for being brought into substantial axial alignment with successive ones of a plurality of wells provided in the base member; means for rotating said tubular member; and means for guiding well head maintenance and servicing appliances through said tubular member between



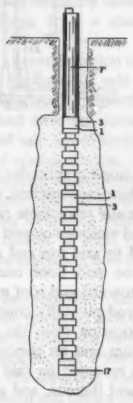
said head portion and said successive ones of the plurality of wells.

4,231,683

PROCESS AND A DEVICE FOR MAKING ANCHORAGES IN SOILS AND ROCKS

Walpy Vanderline, Rua Miralta, 201, San Paulo, Brazil

Filed Aug. 11, 1978, Ser. No. 932,880
Claims priority, application Brazil, Aug. 11, 1977, 7707080
Int. Cl.[3] E21D *20/02*
U.S. Cl. 405—260 **7 Claims**



1. An apparatus for providing an anchorage for fastening a rod to soils, rocks or the like, said apparatus comprising an elongate anchorage sector and a free sector attached to one end of said anchorage sector, said anchorage sector comprising an upper ringed support member adjacent said free sector, a lower ringed support member and at least one intermediate ringed support member disposed therebetween, adjacent ringed support members being connected by a hollow tubular internal jacket and a hollow tubular external jacket disposed around said internal jacket, said jackets defining a tubular compartment therebetween, said intermediate ringed support member comprising:

(a) a top portion, a bottom portion and a substantially cylindrical inner passage extending therebetween, said inner passage having a cross sectional area which is substan-

tially co-extensive with and in communication with the hollow portion of said internal jacket whereby a longitudinal internal passage is formed which extends along substantially the length of said anchorage sector;

(b) at least one radial injection passage extending between said inner passage and an external surface for providing fluid communication between said longitudinal internal passage and the exterior of said anchorage sector, said external surface having an elastic means disposed thereon at least in the vicinity of and covering said radial injection passage;

(c) at least one longitudinal opening, extending between said top and bottom portions, adapted to receive a wire therethrough; and

(d) at least one longitudinal injection passage extending between said top and bottom portions for providing fluid communicaton between adjacent compartments, said longitudinal opening, said radial injection passage and said longitudinal injection passage being non-communicating.

4,231,684

SHIELD TYPE SUPPORT FOR USE IN UNDERGROUND MINING WITH LEMNISCATE GUIDE RODS

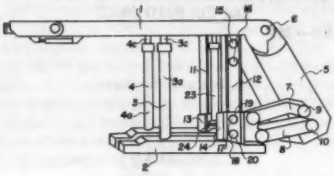
Harry Oppenländer, Wetter, and Ulrich Wilde, Essen, both of Fed. Rep. of Germany, assignors to Thyssen Industrie AG, Fed. Rep. of Germany

Filed Aug. 22, 1979, Ser. No. 68,559

Claims priority, application Fed. Rep. of Germany, Sep. 22, 1978, 2841190

Int. Cl.³ E21D *15/44*

U.S. Cl. 405—291 **12 Claims**



1. A shield-type stope support for use in underground mining, comprising a floor construction, at least one fluid pressure operated extensible and retractable ram having a top end, and having a bottom end mounted on said floor construction, a roof member connected to said top end of said ram, at least one column mounted on said floor construction extending upwardly therefrom toward said roof member, a breaking shield having one shield end pivotally connected to said roof structure at a spaced location from the connection of said roof structure to said ram and an opposite shield second end, a lemniscate support mounted on said column for upward and downward movement thereon, and a pair of lemniscate guide rods having first and pivotally connected to said support and opposite second ends pivotally connected to said shield second end.

4,231,685

ROOF SUPPORT UNIT

Harry Rosenberg, Lüdinghausen, and Lubomir Plevak, Lünen, both of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Lünen, Fed. Rep. of Germany

Filed Jan. 2, 1979, Ser. No. 630

Claims priority, application Fed. Rep. of Germany, Jan. 2, 1978, 2800004

Int. Cl.³ E21D *15/44*

U.S. Cl. 405—296 **8 Claims**

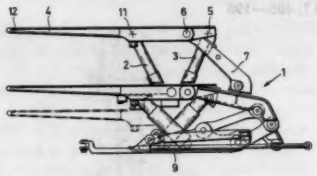
1. A roof support unit for use in a mineral mining working, comprising:

(a) a roof shield supported on a floor sill by means of at least two hydraulic props,

(b) a goaf shield pivotally linked to both the roof shield and the floor sill,

(c) at least one of the hydraulic props being inclined towards a face-side of the unit and pivotally engaging the roof shield,

(d) at least another one of the hydraulic props being:



(1) oppositely inclined towards a goaf-side of the unit,

(2) pivotably attached to the roof shield at a point nearer the goaf-side thereof than the axis of the pivotal linkage between the goaf shield and the roof shield, and

(3) passing through an aperture in the goaf shield, and

(e) said at least one prop and said at least another one prop crossing between their ends.

4,231,686

CONTROL SYSTEM OF APPARATUS FOR TRANSPORTING SLURRY

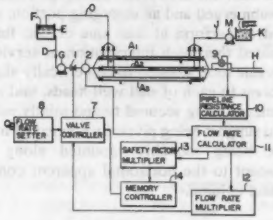
Masakatsu Sakamoto, Matsudo; Kenji Uchida, Kashiwa, and Yukishige Kamino, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Sep. 5, 1979, Ser. No. 72,672

Claims priority, application Japan, Sep. 6, 1978, 53-108633

Int. Cl.³ B65G *53/30, 53/66*

U.S. Cl. 406—14 **3 Claims**



1. A control system of an apparatus for hydraulically transporting slurry prone to sedimentation through a pipeline system including at least one feed pipe into which a slurry and a driving liquid are alternately fed, and a transport pipe, connected to the feed pipe, through which the slurry is transported, the control system comprising:

a flow rate regulating valve means provided at a predetermined portion of the pipeline system;

a flow meter means provided in series with said flow rate regulating valve for metering a flow through the pipeline system and providing an output signal of the metered flow;

a differential pressure gauge means provided at another predetermined portion on the pipeline system for detecting a pressure drop and for providing an output signal of a detected pressure drop;

pipeline resistance calculating means for calculating a pipeline resistance in response to an output signal from said differential pressure gauge means;

a flow rate calculating means for storing a flow rate pipeline resistance characteristic at a given degree of opening of

said flow rate regulating valve means, and for calculating the flow rate at a critical flow velocity for slurry sedimentation on the basis of the flow rate-pipeline resistance characteristic in response to output signals received from the flow meter means and the pipeline resistance calculating means and for providing an output signal of the calculated flow rate;

safety factor multiplying means for multiplying the flow rate at the critical flow velocity in response to an output signal from said flow rate calculating means by a safety factor and for providing an output signal;

memory controlling means for storing flow rate values at the critical flow velocity in response to an output signal from said safety factor multiplying means and for providing an output signal of a maximum flow rate of those flow rate values at the critical flow velocity; and

a valve controlling means for controlling a degree of opening of said flow regulating valve in response to an output signal from said memory controlling means;

whereby the slurry is transported through the pipeline system at a flow velocity above the critical flow velocity for slurry sedimentation.

4,231,687

APPARATUS FOR SEPARATING INDIVIDUAL ASSEMBLY PARTS FROM A COHERENT MASS AND FOR ORIENTING THE INDIVIDUAL PARTS

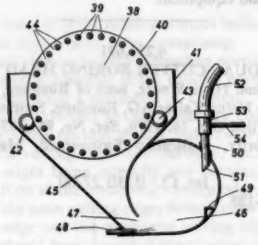
Walter Sticht, Wankhamerstrasse 8, A-4800 Attnang-Puchheim, Austria

Division of Ser. No. 826,307, Aug. 22, 1977, abandoned. This application Jun. 1, 1979, Ser. No. 44,633

Claims priority, application Austria, Oct. 6, 1976, 7402

Int. Cl.³ B65G *53/08*

U.S. Cl. 406—52 **4 Claims**



1. An apparatus for separating individual assembly parts from a coherent mass of said parts and for orienting the individual assembly parts, which comprises

(a) a rotary drum for storing the mass of said parts, the rotary drum including

(1) a plurality of axially extending elongated support members for the stored mass of said parts, the support members constituting the peripheral wall of the drum and the support members being peripherally spaced from each other to define slot-shaped discharge opening therebetween, the openings having a width permitting single ones of the parts to pass therethrough by gravity and a length permitting a plurality of the parts to pass whereby clusters of said assembly parts resolved by rotation of the drum from the coherent mass and the individual parts pass through the openings by gravity, and means for rotating the drum

(b) a housing of circular cross section defining whirlpool chamber arranged downstream of the rotary drum and having an inlet of a dimension permitting the clusters of assembly parts to be received and passed therethrough, the whirlpool chamber having an axis extending perpendicularly to the circular cross sectional plane of the housing,

(c) a transfer passageway leading from the rotary drum to the inlet of the whirlpool chamber whereby the inlet is in communication with the peripheral drum openings,

(d) nozzle means arranged at the inlet of the housing for directing a jet of gas into the whirlpool chamber in a direction substantially tangential to the circle defined by the housing, the tangential jet of gas creating a gaseous whirlpool in the chamber for moving and separating the clusters into individual assembly parts, and

(e) conveyor means remote from the inlet and arranged to receive individual ones of said assembly parts moved by the gas jet, the conveyor means being arranged to orient the individual assembly parts.

4,231,688

APPARATUS FOR CLEARING SILAGE OR SIMILAR MATERIAL

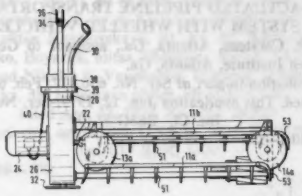
Johann Wolf, A-4644 Scharnstein, Austria

Filed Feb. 9, 1978, Ser. No. 876,242

Claims priority, application Fed. Rep. of Germany, Mar. 7, 1977, 2709850

Int. Cl.² B65G *53/40*

U.S. Cl. 406—76 **38 Claims**



1. Apparatus for clearing relatively dense and matted stored material, particularly silage, from a stack of said material, comprising:

means locatable over a central portion of said stack of material for conveying particles of said material from said central portion upwardly and outwardly of said stack; and

means for loosening and directing particles of said material from a periphery of said stack surrounding said central portion toward said central portion, comprising:

at least on frame member cantilevered substantially horizontally at an inner end from said conveying means, said frame member extending radially outwardly from said conveying means; at least two push rods each having tool means extending downwardly for engaging said material;

driven means for carrying and reciprocating said push rods such that said push rod tool means travel along a closed circular path, lying in a vertical plane parallel to said frame member, having a lower material-engaging path portion in a first direction wherein particles of said material are loosened and drawn toward said conveying means by said tool means, and an elevated path portion in the opposite direction wherein said tool means are returned to a position suitable for re-travelling said lower path portion, said at least two push rods mounted on said push rod carrying means such that said push rods are offset in phase relative to one another by equal angular spacings when reciprocated; and

means for driving said push rod carrying means;

said push rod carrying means comprising:

first and second eccentric cranks at respective ends of said frame member, each said crank comprising a crankshaft having a horizontal axis of rotation fixedly disposed perpendicular to said frame member, each end of each said push rod being rotatably mounted at a predetermined distance from the axis of rotation on a respective one of said crankshafts whereby rotation

of said crankshafts causes said tool means to travel along said circular path; and

means for operatively connecting at least one of said cranks to said driving means; and

said conveyor means comprising:

a suction box having a fan within said suction box mounted on a driven shaft and having a suction opening facing said push rods,

a vertical pipe section communicating with said suction box and being disposed along a vertical axis through said suction box, and

a curved pipe section rotatably mounted on an upper end of said vertical pipe section, said suction opening disposed in a region near the end of said lower, material-engaging path portion of said tool means, the apparatus further comprising a support member adapted to rest upon said stack of stored material, said suction box being rotatably mounted on said support member such that said conveyor means and said cantilevered frame member are rotatable with respect to said stack and said curved pipe section.

4,231,689

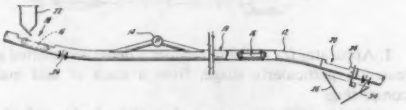
AIR-ACTUATED PIPELINE TRANSPORTATION SYSTEM WITH WHEELED VEHICLES

Marion R. Carstens, Atlanta, Ga., assignor to Georgia Tech Research Institute, Atlanta, Ga.

Continuation-in-part of Ser. No. 656,022, Feb. 6, 1976, abandoned. This application Jan. 12, 1977, Ser. No. 757,508

Int. Cl.³ B65G *51/04*

U.S. Cl. 406—155 **26 Claims**



25. An air actuated pipeline tranportation system having pump means with at least one pump connection connected to the pipeline for creating an air flow in the pipeline and including

a vehicle comprising,

a vehicle body having a generally round cross-sectional area,

at least two load carrying wheels connected to the vehicle adjacent the bottom of the vehicle body adjacent each end of the body for supporting the vehicle for movement through the pipeline,

at least one of the wheels on each side of the body toed outwardly in the direction of movement of the vehicle for coacting with the interior of the conduit for automatically maintaining the vehicle upright in said conduit, said pipeline including at least one opening in the bottom of the pipeline spaced from all of the pump connections to the pipeline, said opening being wider than the width of a wheel but less than the width of the distance between the wheels at each end of the body whereby an upright vehicle will pass over the opening without the wheels being caught in the opening and debris will fall out of the opening.

4,231,690

TUBE LOCK DRILL TOOL

David C. Burns, Trafford, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 21, 1978, Ser. No. 898,347

Int. Cl.² B23B *41/00, 41/10*

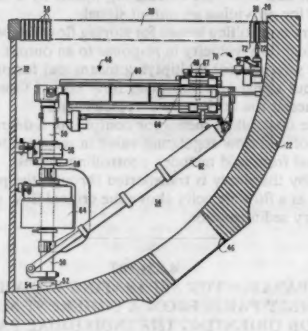
U.S. Cl. 408—80 **7 Claims**

1. A tube lock drill tool for remotely performing operations on equipment including positioning means disposed in said equipment for selectively positioning a tool with respect to said equipment for performing operations on said equipment, said tool comprising:

locking means associated with said positioning means for securing said tool in proper relationship to said equipment;

cutting means disposed on said locking means for performing cutting operations on said equipment;

a support member attached to said positioning means;



a rotatable pin disposed within said support member;

a first arm attached at one end to said pin and at the other end to said cutting means; and

rotating means disposed on said positioning means and connected to said pin for selectively rotating said pin thereby causing said cutting means to be selectively advanced toward said equipment.

4,231,691

DUAL CUTTER BORING HEAD

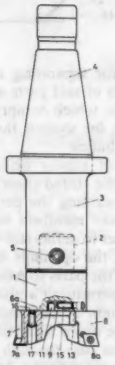
Dieter Pape, and Hans Woerz, both of Rümlang, Switzerland, assignors to Heinz Kaiser AG, Rümlang, Switzerland

Filed Oct. 16, 1978, Ser. No. 951,325

Claims priority, application Switzerland, May 11, 1978, 5156/78

Int. Cl.³ B23B *27/00*

U.S. Cl. 408—185 **4 Claims**



1. A dual cutter rotating boring head, having two cutting blade holders attached in a transverse slot provided in the exposed leading face of the head, comprising:

a pair of adjusting screws disposed within said slot, said adjusting screws being positioned to push said blade holders in a radial direction,

each blade holder comprising an additional adjusting screw

and the axis of said additional adjusting screw being parallel to the longitudinal axis of said boring head,

said additional adjusting screws bearing upon the bottom surface of the slot and pushing said blade holders in an axial direction,

and the two cutting blade holders being adapted to be firmly clamped in any position by means of a set screw positioned co-axially with respect to the head.

4,231,692

DRILL COMPRISED OF HARD METAL FOR DRILLING CONTACT HOLES IN CIRCUIT BOARDS AND THE LIKE

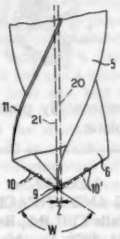
Bernhard Brabetz, and Helmut Hackl, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Sep. 14, 1978, Ser. No. 942,279

Claims priority, application Fed. Rep. of Germany, Sep. 19, 1977, 2742104

Int. Cl.³ B23B *51/02*

U.S. Cl. 408—230 **3 Claims**



1. A hard metal drill for drilling contact holes in multi-layer circuit boards of synthetic resin, comprising:

(a) a twisted portion having a grinding portion at a leading end thereof, a diameter of the twisted portion and grinding portion being a maximum of 1.5 mm;

(b) said twisted portion having subsidiary cutting edges;

(c) said grinding portion having main cutting edges and a transverse cutting edge therebetween, each of said main cutting edges being opposite and running into a spiral-shaped flute at the transverse cutting edge;

(d) one of the main cutting edges being longer than the other cutting edge and the transverse cutting edge being laterally displaced from a central longitudinal axis of the drill such that when the drill is drilling a hole, a gap of at least 20 μm but less then 50 μm is formed between the outermost twisted portion of the drill and a side of the hole being drilled as a result of eccentric rotation of the drill;

(e) said flutes having different depth dimensions with respect to one another; and

(f) the flutes having depth dimensions chosen such that the flutes are asymmetrical to a central lateral cross-sectional axis of the dril and symmetrical to an eccentric lateral cross-sectional axis of the drill which is parallel to and displaced from the central lateral cross-sectional axis by a distance corresponding to the displacement of the transverse cutting edge from the central longitudinal axis.

4,231,693

REAMER WITH RADIAL RELIEF

James A. Kammeraad, Holland, Mich., assignor to K-Line Industries, Inc., Holland, Mich.

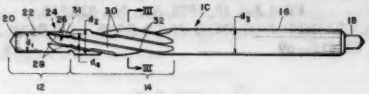
Filed Feb. 28, 1979, Ser. No. 16,014

Int. Cl.³ B23B *51/00*; B23P *6/00*; B23B *35/00*

U.S. Cl. 408—230 **28 Claims**

1. A finish reamer adapted to finish ream a hard material, said reamer comprising:

a member having a back tapered body section, said body section having a plurality of flutes, said flutes defining a plurality of cutting blades, each cutting blade having an axially extending radial relief formed therein for dissipating heat during reamer operation, said relief extending



along a portion only of said cutting blade and each of said cutting blades including a pilot and surface finish portion rearwardly of each of said radial reliefs.

4,231,694

APPARATUS FOR REMOVING A WELDING BULGE FROM PIPES

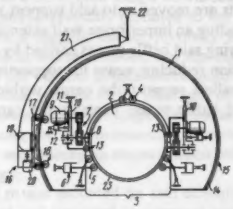
Mikhail R. Unigovsky, ulitsa Pushkinskaya, 21, kv. 33; Evgeny V. Rulevsky, ulitsa Vyshgorodskaya, 30, kv. 64; Fedor I. Sapa, ulitsa Kondratjuka, 2a, kv. 66; Alexei T. Parkhomchuk, ulitsa Kopylovskaya, 21, kv. 87; Arnold S. Yampolsky, ulitsa Kopylovskaya, 21, kv. 80; Veniamin S. Rotenfeld, ulitsa Sholom-Aleikhema, 1, kv. 17, all of Kiev; Vasily T. Ivanov, Borispol, ulitsa Shevchenko, 5, kv. 4, Kievskaya oblast; Isaak Y. Nemirovsky, ulitsa Kopylovskaya, 21, kv. 67, Kiev; Viktor M. Kovalenko, Boyarka, ulitsa Zhdanova, 65, kv. 52, Kievskaya oblast, and Nikolai S. Vnuchenko, Borispol, ulitsa Tsentralnaya, 6, kv. 35, Kievskaya oblast, all of U.S.S.R.

Filed Apr. 12, 1979, Ser. No. 29,323

Claims priority, application U.S.S.R., May 22, 1978, 2618997

Int. Cl.³ B23C *1/20*

U.S. Cl. 409—179 **2 Claims**



1. An apparatus for removing a welding bulge from resistance welded pipes, which comprises:

a U-shaped carrier adapted to be placed at the bulge zone in spaced circumferential relationship to the welded pipes and having end portions spaced apart for the welded pipes to pass therebetween, an arcuate guideway having inner and outer surfaces, and an arcuate toothed segment both adjacent the outer periphery of said carrier and extending the length thereof;

centering rollers mounted on said carrier adjacent the inner periphery thereof, means providing that at least two of said centering rollers are radially movable with respect to the center of the welded pipes circumference and disposed on opposite end portions of said carrier;

cutting tool holders disposed on said carrier for movement to and from the weld bulge;

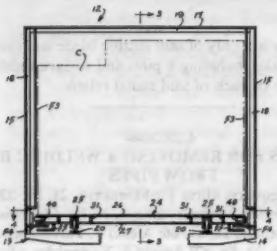
a motor-operated carriage with means to be rigidly connected to a lifting mechanism of a vehicle used for raising and carrying the apparatus, which carriage including spaced support rollers and a driving gear wheel, said spaced rollers being disposed in engagement with the inner and outer surfaces of said arcuate guideway and said driving gear being in driving engagement with the toothed segment of said carrier to rotate said carrier while said carriage remains immobilized.

4,231,695

CARGO LOADING AND UNLOADING APPARATUS FOR TRUCKS

Robert M. Weston, Sr., P.O. Box 812, Bayou La Batre, Ala. 36509

Filed Jul. 10, 1978, Ser. No. 923,515
Int. Cl.[3] B60P *7/00*; B61D *45/00*; B20P *1/64*; B63B *25/00*
U.S. Cl. 410—69 **8 Claims**



1. An apparatus for handling cargo comprising the combination of a vehicle and a plurality of mobile pallets which are selectively moved into or removed from the vehicle, said vehicle including a body having at least side wall means mounted on a chassis and being devoid of a continuous floor, at least one longitudinally extending pallet support means mounted on said chassis, baffle means carried by said side wall means and extending substantially the full length of said body, said baffle means extending inwardly from said side wall means toward said support means to a position underlying said pallets when said pallets are moved onto said support means, each of said pallets including an imperforate wall extending across said body and overlying said baffle means carried by each side wall means, and friction reducing means for supporting said pallets, whereby said pallets support the cargo within body of the vehicle and said baffle means protects the cargo within the vehicle.

4,231,696

MULTI-FUNCTION END EFFECTOR

Stuart L. Rieben, Mt. Lebanon, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 14, 1978, Ser. No. 915,411
Int. Cl.[2] B25J *9/00*
U.S. Cl. 414—5 **14 Claims**

1. A multi-function end effector for performing operations on equipment comprising:

a vertical member capable of being disposed in said equipment;

centering means attached to said vertical member and having plates capable of relative horizontal motion;

tool holding means with a crescent-shaped gear for holding tools and mounted on said centering means for supporting said tools in relation to said equipment for performing operations on said equipment; and

vertical drive means attached to said vertical member and to said centering means for vertically moving said tool holding means relative to said vertical member thereby vertically positioning said tools relative to said equipment, said

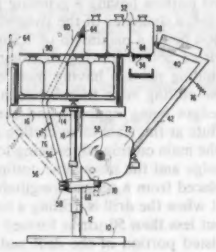
centering means horizontally positioning said tools by movement of said plates.

4,231,697

BOTTLE PACKAGING AND UNPACKAGING MACHINE

Henry H. Franz, 3201 Falls Cliff Rd., Baltimore, Md. 21211

Filed Jul. 21, 1978, Ser. No. 926,958
Int. Cl.[3] B65G *57/10*, *59/02*
U.S. Cl. 414—37 **7 Claims**

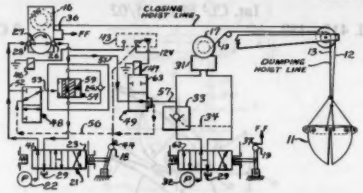


1. A bottle packaging and unpackaging apparatus for use with a conveyor delivering bottles from a bottle-making machine to a bottle-filling machine, a plurality of spaced base members having vertically disposed leg members mounted thereon, a compartment having side and end members and supported on said leg members, an elevating platform positioned within said compartment, a pusher bar positioned on one side of said compartment for intermittently pushing in row form a plurality of bottles from said conveyor across a side of said compartment and onto said platform, a second pusher bar located on the other side of said compartment for intermittently pushing in row form a plurality of bottles from said compartment onto said conveyor, each of said pusher bars having a rocker shaft connected thereto for moving said pusher bars across said compartment towards the other pusher bar, a rotatable drive shaft carried by one of said leg members with means for rotating said drive shaft, and means connecting said drive shaft with each of said rocker shafts for intermittently moving said pusher bars towards and away from one another over said platform.

4,231,698
SYSTEM FOR ONE-HAND CONTROL OF TWO WINCHES DURING HOISTING OF CLOSED CLAMSHELL, WITH DIFFERENTIATION

William J. Lado, Rome, N.Y., assignor to Pettibone Corporation, Chicago, Ill.

Filed Jan. 9, 1978, Ser. No. 867,704
Int. Cl.³ B66D 1/26
U.S. Cl. 414—624 6 Claims

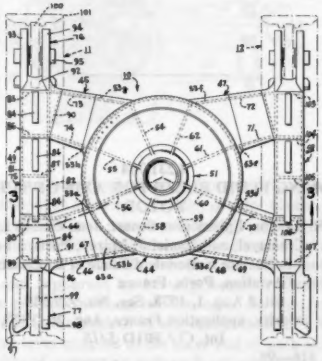


1. A hydraulic system for controlling a clamshell bucket by two hoist lines of which a first can close and raise the clamshell and the second can dump the clamshell if raised relatively to the first, said system including a first hydraulic motor and winch for the first hoist line and a second hydraulic motor and winch for the second hoist line, and means operable at will, when the first winch motor is operated to draw in the first hoist line, for supplying to the second winch motor a sufficient supply of hydraulic fluid to operate said second winch motor enough to avoid the development of excessive slack in the second hoist line, and means effective throughout raising the clamshell for controlling the pressure of said supply to provide a pressure sufficient to draw in the second hoist line, when slack; said system including means responsive to the back pressure of the fluid supplied to the second motor for limiting that pressure to a value too low to start dumping the clamshell.

4,231,699
LOWER AND CRAWLER FRAME CONSTRUCTION FOR CRAWLER PROPELLED MACHINES

George J. Thompson, Marion, Ohio, assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jan. 24, 1979, Ser. No. 6,552
Int. Cl.³ B66C 23/84; E02F 3/32
U.S. Cl. 414—687 19 Claims

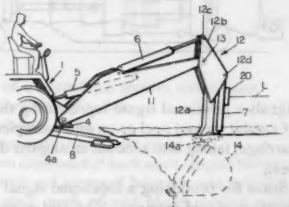


10. A lower works construction for a machine having a rotatable upper frame comprising a lower frame section, a plurality of leg sections mounted on said lower frame section and projecting laterally therefrom and propel unit support frames mounted on the outer ends of said leg sections, said lower frame section having diagonally disposed bulkheads, said leg sections having laterally projecting bulkheads, the inner ends of which are disposed in registry with said diagonally disposed bulkheads of said lower frame section and said support frame sections having laterally projecting bulkheads, the inner ends of which are disposed in registry with said laterally disposed bulkheads of said leg sections whereby axial and radial loads imposed on said lower frame section will be transferred along continuous paths provided by said bulkheads to said support frame sections.

4,231,700
METHOD AND APPARATUS FOR LASER BEAM CONTROL OF BACKHOE DIGGING DEPTH

Robert H. Studebaker, Dayton, Ohio, assignor to Spectra-Physics, Inc., Mountain View, Calif.

Filed Apr. 9, 1979, Ser. No. 28,178
Int. Cl.³ E02F 9/20
U.S. Cl. 414—700 4 Claims



1. In a backhoe having a platform movable about a vertical axis, an outreach boom pivotally mounted on the platform for movement about a horizontal axis, a downreach boom having one end horizontally pivotally mounted to the free end of the outreach boom, a digging bucket pivotally mounted to the other end of the downreach boom, and separate power means for controlling the vertical pivotal movements respectively of the outreach boom relative to the platform, of the downreach relative to the outreach boom, and of the bucket relative to the downreach boom, the improvements comprising:

1. means for establishing an above ground reference plane of laser energy;
2. photocell means mounted on said downreach boom and constructed and arranged to intercept said plane of laser energy throughout the digging stroke of the backhoe;
3. means responsive to the signals generated by said photocell means for varying the vertical pivotal angle of said outreach boom relative to said platform to maintain said photocell means on said downreach boom at a predetermined position relative to said reference plane throughout the digging stroke of the backhoe, and
4. means for maintaining the bucket in a fixed position throughout the digging stroke of said backhoe, whereby the digging edge of said bucket moves in a plane parallel to said overhead reference plane of laser energy.

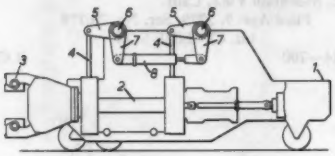
4,231,701
MANIPULATOR

Anthony E. Middleton, Rotherham, and Brian McQuillin, Sheffield, both of England, assignors to Davy-Loewy Ltd., Sheffield, England

Filed Apr. 21, 1978, Ser. No. 899,101
Claims priority, application United Kingdom, Mar. 31, 1977, 13574/77
Int. Cl.³ B66F 9/00
U.S. Cl. 414—730 10 Claims

1. A manipulator comprising
(a) a carriage movable along a prescribed path;
(b) a peel mounted on said carriage for gripping and supporting a workpiece;

(c) means for moving said peel relative to said carriage in the direction of movement of said carriage;
(d) means for adjusting the vertical position of said peel relative to said carriage;
(e) means for adjusting an angular attitude of said peel relative to the direction of movement of said carriage; and
(f) a positional indicating and control system for said peel, including:
(g) a plurality of generator means, each generating signals representing one parameter of the disposition of said peel relative to said carriage;
(h) computing means for determining from said parameter



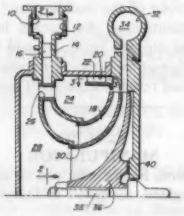
signals a positional signal representing the actual position of a point on said peel or on said workpiece relative to the carriage, taking into account an angular disposition of said peel;
(i) means for producing a locational signal representing the location of said carriage along said prescribed path;
(j) means for adding said locational signal to said positional signal to produce an output signal representing the position of said point relative to a stationary reference such as the ground; and
(k) means for controlling the movement of said peel relative to said carriage and to the position of said carriage along the prescribed path in response to said output signal.

4,231,702

TWO-STAGE TURBO COMPRESSOR

Sankaraiyer Gopalakrishnan, Brea, Calif., and William L. Kuivinen, Mount Prospect, Ill., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed Aug. 24, 1979, Ser. No. 69,424
Int. Cl.³ F01D *1/12*
U.S. Cl. 415—56 **6 Claims**



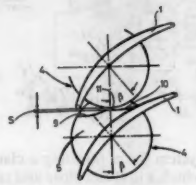
1. In a two stage rotary compressor having first and second stage centrifugal impellers connected to a rotatable shaft, inlets to and outlets from each stage and with the inlet to the second stage being connected to the discharge from the first stage and with the outlets from each stage being located at the same radial distance from the shaft, the improvement which comprises: the inlet to said second stage impeller being located radially inwardly of the inlet to the first stage impeller.

4,231,703

VARIABLE GUIDE VANE ARRANGEMENT AND CONFIGURATION FOR COMPRESSOR OF GAS TURBINE DEVICES

Wolfgang Weiler, Dachau, Fed. Rep. of Germany, assignor to Motoren- und Turbinen-Union Muenchen GmbH, Munich, Fed. Rep. of Germany

Filed Aug. 9, 1979, Ser. No. 65,099
Claims priority, application Fed. Rep. of Germany, Aug. 11, 1978, 2835349
Int. Cl.³ F01B *25/02*
U.S. Cl. 415—159 **9 Claims**



1. A variable guide vane arrangement for use in a high-load compressor having at least one axial-flow stage in turbomachines including gas turbine engines, comprising:
a plurality of guide vanes positioned radially adjacent one another about a circumference in the axial flow stage of the compressor, each vane having a low-pressure and a high-pressure side during operation;
a plurality of generally disk shaped turntable members, each of said vanes being secured at its outer end to one of said turntable members and each of said turntable members being rotatably mounted about said circumference, the diameter of each of said turntable members being greater than the spacing between adjacent guide vanes; and
each of said turntable members being generally round and having a cut-out portion on the side adjacent to the low-pressure side of said guide vane secured thereto, said cut-out portion being formed by first, second and third arcs which merge together to form an edge surface adapted to closely abut the arcuate circumference of the next adjacent turntable member at all rotational settings of said guide vanes.

4,231,704

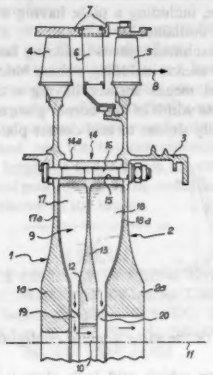
COOLING FLUID BLEED FOR AXIS OF TURBINE ROTOR

Michel R. Ayache, Epinay sous Senart; Jean-Claude L. Delonge, Moissy Cramayel, and Daniel J. Marey, Paris, all of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Paris, France

Filed Aug. 1, 1978, Ser. No. 929,910
Claims priority, application France, Aug. 26, 1977, 77 26637
Int. Cl.³ F01D *5/18*
U.S. Cl. 416—95 **3 Claims**

1. In a device for moving air from the jet flow of an axial compressor for a gas turbine, said compressor having adjacent rotor disks, to be conducted along the axis of the turbine for cooling the same and including centripetal vanes in the form of spaced paddles extending radially between adjacent rotor disks, the improvement comprising:
said paddles being part of a wheel between said disks and

secured at its outer periphery to said disks to form a brace and torque transmitting member therebetween, said wheel



including a central disk with said paddles extending axially from opposite sides thereof.

4,231,705

HELICOPTER ROTOR

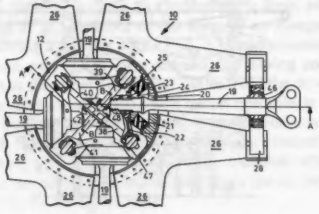
Kenneth Watson, Yeovil, England, assignor to Westland Aircraft Limited, Yeovil, United Kingdom

Filed Sep. 7, 1978, Ser. No. 940,481

Claims priority, application United Kingdom, Sep. 7, 1977, 37426/77

Int. Cl.³ B64C *27/72*

U.S. Cl. 416—108 R **6 Claims**



1. A helicopter rotor including a hollow rotor hub arranged for rotation about an axis and a plurality of rotor blades extending radially of said axis, means attaching each blade to the outer end of an individual spindle, each said individual spindle having its inner end protruding into the interior of the hollow rotor hub and supported by bearing means within the hub arranged to permit rotational movement of the spindle about its axis to change the pitch of its associated blade, a respective pitch control lever coupled to the inner end of each said spindle, a plurality of connecting rods each articulated at its upper end, through a universal joint, to a respective one of said pitch control levers, the lower end of the connecting rods being attached to a common housing having independently rotatable means for connection to helicopter flying controls, one of said connecting rods being fixedly attached to said common housing, and the remaining connecting rods being attached to said common housing through universal joints.

4,231,706

IMPELLER OF A CENTRIFUGAL BLOWER

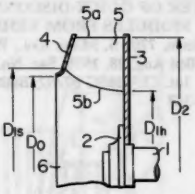
Shinjiro Ueda, Kashiwa; Yoshihiro Takada, Ibaraki; Haruo Mishina, Ibaraki, and Atsuhiko Kuroda, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 21, 1978, Ser. No. 898,995

Claims priority, application Japan, Apr. 27, 1977, 52-47918; Apr. 27, 1977, 52-47919

Int. Cl.³ F04D *29/30*

U.S. Cl. 416—186 R **3 Claims**



1. An impeller of a centrifugal blower comprising:
a hub plate in the form of a disk;
a cone-shaped shroud plate;
a rotary shaft supporting said hub plate; and
a plurality of two dimensional backward shaped blades made of sheet material and arranged between said hub plate and said shroud plate, each of said blades having relatively large blade inlet and outlet widths and a given blade area;
wherein the improvement comprises arrangements whereby the center line of each of said blades projected on a plane perpendicular to said rotary shaft is shaped in a concave curve with respect to the direction of rotation of said rotary shaft so as to provide an increased outlet blade angle, and the inlet diameter of each of said blades on the side of said shroud plate is greater than the inlet diameter thereof on the side of said hub plate, and the leading edge of each of said blades is shaped, in a meridional plane, in a convex smooth curve directed radially inwardly of the impeller whereby said blade area is not substantially reduced regardless of said increased outlet blade angle.

4,231,707

FLUID SUPPLYING DEVICE

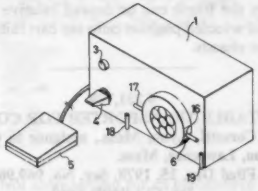
Sadao Tokorozawa, Nakai; Toyoji Shimizu, Oi, and Naomi Yoshizawa, Hatano, all of Japan, assignors to Pilot Man-Nen-Hitsu Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 25, 1979, Ser. No. 6,960

Claims priority, application Japan, Jan. 31, 1978, 53-9632

Int. Cl.³ F04B *49/00*

U.S. Cl. 417—12 **22 Claims**



1. A fluid supplying device comprising: a peristaltic pump including depression and delivery means and an electric motor, said depression and delivery means including an elastic tube (**17**) for receiving fluid and an assembly of depressing members (**15**) for alternately constricting and relaxing said elastic tube, and a drive shaft (**10**) connecting said depression and delivery means to said electric motor (**24**); a rotary member (**21**) disposed on said drive shaft to rotate with said drive shaft; a

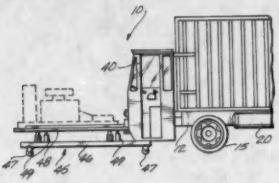
plurality of discharge-amount transmitting means (22) provided on said rotary member such that the distances between respective discharge-amount transmitting means can be varied; a detector (23) disposed relative to said discharge-amount transmitting means for detecting the passage of said discharge-amount transmitting devices; and a switch (40) connected between said detector and said electric motor to selectively deenergize said electric motor.

4,231,708

TRANSFER OF QUICK-DISCONNECT ENGINE MODULES FROM VEHICLES

George O. Telesio, 7709 S. Milna Ave., Whittier, Calif. 90601

Filed Aug. 28, 1978, Ser. No. 937,109
Int. Cl.[3] B65G *67/02;* B60S *5/02*
U.S. Cl. 414—343 8 Claims



1. A service cart for transferring thereto and therefrom a vehicle engine assembly which includes a support frame having parallel side members, the frame being releasably matable with a vehicle chassis for movement into and out of an operative position in the vehicle through an end of the chassis, the vehicle including cart positioning means at the end thereof through which the engine assembly is movable, selectively operable latch means cooperable between the chassis and the frame in a selected position of the frame in the vehicle for securing the frame from movement relative to the chassis in a direction corresponding to removal of the frame from the chassis, and release means operable for disabling the latch means, the cart comprising

(1) a base,

(2) a pair of frame side member engaging rails,

(3) means movably mounting the rails on the base in parallel relation and spaced a distance corresponding to the spacing between the frame side members, the mounting means including

(a) guide means for guiding the rails vertically relative to the base, and

(b) means for adjusting the vertical distance between the base and each end of each rail, and

(4) locating means carried by the cart matable with the positioning means and operable when mated with the positioning means for operating the release means, whereby the frame can be moved relative to the chassis from said selected position onto the cart rails and removed from the chassis.

4,231,709

DEMOUNTABLE TRANSPORTER FOR CONTAINERS

Richard M. Corsetti, Lynn, Mass., assignor to Craig Systems Corporation, Lawrence, Mass.

Filed Dec. 15, 1978, Ser. No. 969,980
Int. Cl.[3] B60P *3/40*
U.S. Cl. 414—458 7 Claims

1. A demountable transporter assembly for use with a container having ISO corners, each said corner comprising a plate mounted on said container to define an interior cavity, said plate further forming an opening to said interior cavity, said assembly comprising:

an axle and two wheels supporting said axle,

a frame supported by said axle,

lower attachment means, supported by said frame and including a plate having a surface facing toward said container,

upper extendable attachment means pivotally supported by said frame, including a plate having a surface facing toward said container,

each said attachment means including fastener means,

said fastener means including a shear block mounted on said attachment means surface having a depth substantially equal to the width of said corner plate and a configuration substantially similar to said corner plate opening,

a lock plate of the same general configuration as said shear block,

and a rod on which said lock plate is mounted, passing through said shear block and attachment means plate, said rod being rotatable and slidable so that in a first position said lock plate and shear plate are aligned for entering said corner plate opening, and in a second position said lock plate is turned to overlap said opening,

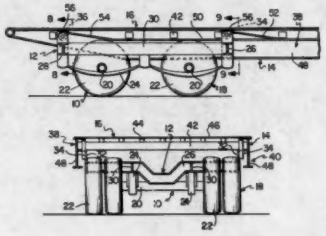
and means for securing said lock plate in said second position.

4,231,710

TILTABLE TRAILER HAVING MOVABLE UNDERCARRIAGE

Donald R. Landoll, Marysville, Kans., assignor to Landoll Corporation, Marysville, Kans.

Filed Mar. 22, 1979, Ser. No. 22,922
Int. Cl.[3] B60P *1/04*
U.S. Cl. 414—475 4 Claims



1. In a trailer,

an undercarriage provided with wheel axle assemblies and with a support below the tops of the assemblies,

said support including an elongated front cross member carried by the assemblies thereahead and an elongated rear cross member carried by the assemblies therebehind,

said front member being connected with and shorter than the rear member and being of substantially the same length as the width of said assemblies,

each member having a roller at each outer end thereof, presenting a first set of front and rear rollers, and a second set of front and rear rollers horizontally spaced from the first set.

the rollers being in a common, normally horizontal plane and being rotatable about axes above said tops of the assemblies with said axes traversing the path of travel of the undercarriage; and

a frame provided with a pair of elongated, parallel, intercon-

nected, horizontally spaced beams extending fore and aft of the undercarriage,

the distance between the beams being greater than the length of said rear member,

one beam having an inwardly and longitudinally extending track resting on said first set of rollers,

the other beam having an inwardly and longitudinally extending tract resting on said second set of rollers,

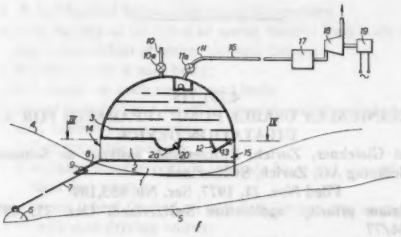
each track having a pair of longitudinally spaced upwardly and rearwardly inclined ramps, one for the corresponding front roller and one for the corresponding rear roller whereby the height of the frame is lowered to an essentially horizontal position when the undercarriage is shifted rearwardly relative to the beams.

4,231,711

EXTRACT OF ENERGY FROM THE SEA

Daniel MacGregor, MacGregor Industries Limited, Canal Estate,, Langley, Buckinghamshire, SL3 6EQ, England

Filed Sep. 8, 1978, Ser. No. 940,668
Int. Cl.³ F04F *11/00*
U.S. Cl. 417—100 **10 Claims**



1. Apparatus for extracting energy from waves in the surface of a body of water, comprising a structure moored in and floating in the body of water and having an inlet channel disposed to face into oncoming waves; and means for converting the energy contained in water entering the inlet channel as a result of the wave motion, to a transmittable form, said means comprising an air chamber in the form of an elongate spiral passage having a passage at one end, in communication with a downstream part of the inlet channel and having an air inlet and outlet at the other end, a rear outlet from the downstream part of the inlet channel, and valve means operable, in response to water flowing into the channel, to close suddenly the rear outlet and cause that water flowing into the channel to enter the chamber and pressurize air in the chamber whereby to enable the pressurized air to be taken from the air outlet from the chamber to do useful work.

4,231,712

SEA WATER LIFTING DEVICE

Wu Shing-Hsiung, 1, Lane 2, Chung Chen Rd., Tan Sui, Taipei Hsiuen, Taiwan

Filed Feb. 16, 1979, Ser. No. 12,817
Int. Cl.³ F04F *1/02*
U.S. Cl. 417—100 **4 Claims**

1. A sea water reservoir device having a base in the sea comprising a plurality of vertically stacked sealed chambers, each having an upper portion and a lower portion,

an air inlet in the upper portion of each chamber,

a water inlet in the upper portion of each chamber,

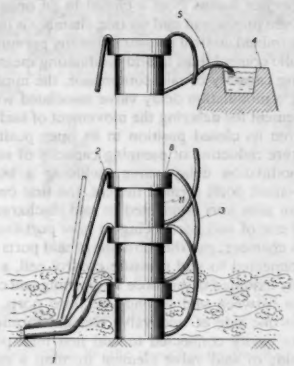
a water outlet in the lower portion of each chamber,

water transmission means connecting each water outlet with the water inlet of the chamber above for transmitting water up the device,

first check valve means in each water inlet for only letting water in,

second check valve means in each water outlet for only letting water out, and

intake pipe means connected to each air inlet from the base of the device for transmitting pressure from sea waves compressing and exhausting air in said pipe means



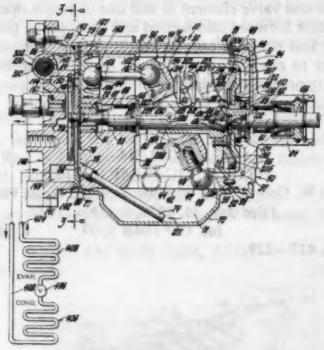
whereby the successive surges from the sea waves alternatingly compress and exhaust the air in said intake pipe means and each sealed chamber thereby forcing water through said water outlets and said water transmission means to the next chamber stacked above, the water outlet of the uppermost chamber being connected to a reservoir.

4,231,713

COMPRESSOR MODULATION DELAY VALVE FOR VARIABLE CAPACITY COMPRESSOR

Richard E. Widdowson, Dayton, Ohio, and Ward J. Atkinson, Paradise Valley, Ariz., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 9, 1979, Ser. No. 28,252
Int. Cl.³ F04B *1/28*
U.S. Cl. 417—222 **2 Claims**



1. In a control arrangement for an automotive air conditioning system including a variable capacity compressor, a condenser, evaporator and fluid conduit means connecting said compressor, condenser and evaporator in a refrigerant circuit, housing means for said compressor including refrigerant gas suction and discharge chambers formed therein, hydraulically operated modulating means for varying the pumping capacity of said compressor between minimum and maximum, means for continuously supplying hydraulic control fluid at a predetermined high pressure to said modulating means, a pressure

operated hydraulic control valve assembly controlling said compressor modulating means including a pressure control cell and movable operator means, passage means adapted to communicate system pressure in said suction chamber to said control cell, a pressure responsive element in said control cell operative at a cell predetermined control pressure for moving said operator means from a closed to an open position when the system pressure in said suction chamber is less than said cell predetermined control pressure, thereby permitting the flow of hydraulic control fluid to said modulating means to reduce the pumping capacity of said compressor, the improvement comprising; a modulation delay valve associated with said control arrangement for delaying the movement of said movable operator from its closed position to its open position to prevent premature reduction of pumping capacity of said compressor, said modulation delay valve including a bore with three spaced-apart ports formed therein, the first one of said ports being an inlet port connected to said discharge chamber, the second one of said ports being an inlet port connected to said suction chamber, and the third one of said ports being an outlet port connected to said pressure control cell, a valve element movably mounted in said bore for opening and closing communication between said second and third ports, means in said bore on one side of said valve element forming a discharge pressure cavity connected to said first inlet port and on the other side of said valve element forming a suction pressure cavity connected to said second inlet port and adapted by movement of said valve element for communication with said third outlet port, and resilient means exerting a force on said valve element in one direction opposing the force exerted by refrigerant gas in said discharge pressure cavity when said pump is operating, the compressed gas in said discharge pressure cavity when said compressor is operating at maximum pump capacity being above a predetermined reference pressure whereby to exert a force on said valve element in the opposite direction causing said valve element to overcome said resilient means closing communication between said second and third ports and trapping refrigerant gas within said pressure control cell at a pressure greater than said predetermined cell control pressure, thereby keeping said movable operator means closed so as to cause said compressor to continue to operate at its maximum pumping capacity, and whereby upon the compressor discharge chamber pressure falling below said reference pressure the delay valve discharge cavity pressure correspondingly falls, allowing said delay valve resilient means to move said valve element in said one direction opening communication between said second and third ports, thereby connecting said pressure control cell to said compressor suction chamber to modulate the capacity of said compressor while obviating premature reduction of maximum pumping capacity of said compressor by said control valve assembly.

4,231,714

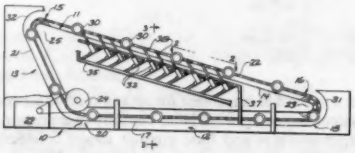
HYDRAULIC PUMP SYSTEM

William W. Colwell, 110 Windsor, George, Wash. 99824

Filed Jan. 15, 1979, Ser. No. 3,252

Int. Cl.[3] F04B *9/00*

U.S. Cl. 417—229 **7 Claims**



1. A hydraulic pump system, comprising:

an inclined ramp having first and second longitudinally spaced ends, the first end of said inclined ramp being elevationally higher than its second end;

endless conveyor means including an upper flight guided along said inclined ramp and a return flight positioned beneath said inclined ramp;

power means operatively connected to said endless conveyor means for imparting motion thereto in a direction such that the upper flight of the endless conveyor means is moved along the inclined ramp from its first end to its second end;

a plurality of equally spaced weight assemblies mounted along the length of the endless conveyor means for integral movement therewith;

and a plurality of pump mechanisms located along the inclined ramp;

each pump mechanism being operatively connected to a common liquid supply and a common discharge manifold;

each pump mechanism further comprising a single acting actuator intersecting the path of movement of the weight assemblies along the upper flight of said endless conveyor means, whereby said pump mechanisms are sequentially actuated in response to movement of the weight assemblies along the upper flight of said endless conveyor means.

4,231,715

CLINICALLY USABLE PUMP APPARATUS FOR A DILATATION DEVICE

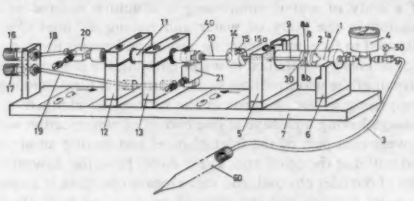
Hans Gleichner, Zurich, Switzerland, assignor to Schneider Medintag AG, Zurich, Switzerland

Filed Nov. 21, 1977, Ser. No. 853,189

Claims priority, application Switzerland, Oct. 21, 1977, 12834/77

Int. Cl.[3] F05B *49/08;* F04B *49/00, 21/00*

U.S. Cl. 417—307 **2 Claims**



1. A clinically usable pump apparatus for a dilatation device having a dilatation catheter, preferably for opening stenoses and occlusions or for closing vessels, ducts and openings, while utilizing a pumpable medium, comprising:

a pump adapted to be connected with the dilatation catheter for applying controlled positive pressure and negative pressure conditions to the dilatation catheter;

means for structuring the pump for accomplishing the double function of generating a positive pressure as well as a negative pressure in a closed hydraulic system between the pump and the dilatation catheter;

mechanical drive means for driving said pump;

said mechanical drive means comprises:

a work cylinder;

a work piston slidably arranged in said cylinder for carrying out forward and return strokes;

said work piston having opposite faces;

means for supplying and impinging opposite faces of said work piston with a pressurized medium; and

an excess-pressure valve for preventing that a preselected maximum pressure will be exceeded in the dilatation catheter.

4,231,716
MECHANICAL LUBRICATING PUMP

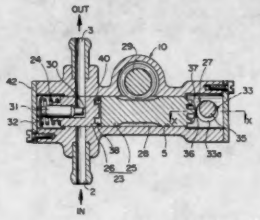
Kenichi Kubota; Osamu Mukai, and Kenji Kariyama, all of Morioka, Japan, assignors to Tohoku Mikuni Kogyo Co., Ltd., Takizawa and Mikuni Kogyo Co., Ltd., Tokyo, both of, Japan

Filed Jul. 21, 1978, Ser. No. 926,619

Claims priority, application Japan, Feb. 27, 1978, 53-24341[U]; Mar. 8, 1978, 53-28523[U]

Int. Cl.³ F04B *19/02;* F16N *13/22*

U.S. Cl. 417—315 **2 Claims**



1. A mechanical lubricating pump comprising:

a body having an inlet and an outlet therein, said body having a cylindrical chamber defined therein;

a driving worm in said body;

cover plates on each end of said body;

a rotatable distributor assembly in said cylindrical chamber, said assembly comprising:

a first rotatable portion;

a second rotatable portion separate from and aligned with said first portion;

a worm wheel formed on said first portion and engagable with said driving worm;

a pump chamber defined in said second portion;

a stroke adjusting mechanism at one end of said first portion;

a plunger in said pump chamber;

a spring biasing said distributor into contact with said stroke adjusting mechanism and holding said plunger in contact with one of the cover plates;

means mechanically transmitting the rotation of said first portion into reciprocation of said second portion relative to said plunger therein and into rotation of said second portion, said means being operable to effect feeding of a lubricating fluid into the pump chamber through the inlet and out of the pump chamber through the outlet when the distributor assembly is rotated in a first direction and when the distributor assembly is rotated in a second direction opposite to said first direction, and when the direction of rotation of the first portion is changed from one of the first and second directions to the other of the first and second directions, to resume feeding of the lubricating fluid after a delay time corresponding to an initial rotation of the first portion only of the distributor assembly through approximately 180° from the time of the change of direction of rotation, said means further comprises a projection on the other end of said first portion, and an arcuate groove in one end of said second portion, said arcuate groove having such an angle of extent that said projection can turn 180° in said groove; and

said stroke adjusting mechanism comprises:

a control pin in said body and extending in a direction perpendicular to said distributor assembly, said control pin having an equi-diameter portion;

a regulating lever external of said body and fixedly secured to one end of said control pin;

a cam face, in the form of an eccentric circle, on said control pin;

and end cam, on one end of said first portion, abuttable with the equi-diameter portion of said control pin; and a central projection, at a center of said end cam, abuttable with the cam face of the control pin.

4,231,717
ENGINE DRIVE TYPE GENERATOR BLOWER

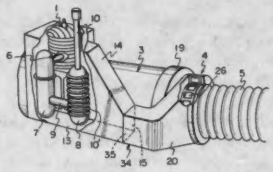
Sigeru Onishi, Kanazawa, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan, a part interest

Filed Oct. 10, 1978, Ser. No. 950,082

Claims priority, application Japan, Oct. 11, 1977, 52-120896

Int. Cl.³ F26B *19/00;* F04B *35/00*

U.S. Cl. 417—364 **7 Claims**



1. A generator blower comprising:

a base frame;

an internal combustion engine mounted on said base frame and having an output shaft;

a generator mounted on said base frame and having an input shaft connected to the output shaft of said engine;

a blower mounted on said base frame and driven by said engine;

duct means enclosing said engine and defining therein a hot air passage which has a cold air inlet and a hot air outlet;

exhaust passage means arranged across said hot air passage and connected to the exterior of said duct means;

a movable duct arranged to enclose said blower, said movable duct having an air outlet and an air inlet which can be aligned with the hot air outlet of said hot air passage and moved from a position wherein the air inlet of said movable duct is aligned with the hot air outlet of said hot air passage to a position wherein the air inlet of said movable duct directly opens into the atmosphere; and

said blower comprises a cylindrical casing enclosing a suction fan and forming thereon a plurality of openings, said movable duct being swingingly mounted on the cylindrical casing of said blower, said blower further comprising means for securing said movable duct to said blower in one position.

4,231,718
FLUID PUMP, PARTICULARLY A FUEL SUPPLY PUMP

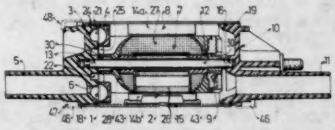
Karl Ruhl, Gerlingen, and Ulrich Kemmner, Sachsenheim, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Aug. 9, 1978, Ser. No. 932,389

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1977, 2741535

Int. Cl.³ F04B *39/06, 17/00*

U.S. Cl. 417—366 **12 Claims**



1. A fluid pump, especially adaptable for supplying fuel to an automotive vehicle, including a pump system and an electric motor connected thereto in driving relationship and arranged in a common housing, said pump system, electric motor and common housing consisting of partially preassembled structural units, comprising:

a first structural unit comprising an outer terminal housing part having an axle made integral therewith;

a second structural rotor unit comprising a pump impeller and a motor armature mounted for rotation on said axle;

a third structural unit comprising a central partial housing surrounding said impeller and motor armature and adjoining the first terminal housing and including permanent magnets for said electric motor; and

a fourth unit comprising a second terminal housing part forming a closure for said partial housing,

a first terminal housing forming a second closure for said partial housing,

said first terminal housing part and said second terminal housing part being made of synthetic material by extrusion molding with outwardly projecting nozzles thereon, one being a suction nozzle and the other being a pressure nozzle,

both said terminal housing parts having radially extending flanges forming stop means for the central partial housing and, said central partial housing further including inwardly extending flanging means for engaging said terminal housings,

said first terminal housing part and second terminal housing part having radial inwardly extending recesses and said central partial housing being provided with inwardly extending flanges for engaging said recesses,

said first terminal housing part being provided with a lateral channel in the form of a partial ring, an interior pressure channel, a suction opening connected with said suction nozzle for the flow of fluid from said suction nozzle into said lateral channel and into said pressure channel and ventilation means for venting gases in said fluid out of said lateral channel,

said ventilation means comprising radially extending groove means opening into said lateral channel and a peripherally located axial slit communicating with said groove for venting gases from said lateral channel.

4,231,719

PROCEDURE AND APPARATUS FOR DEGASSING FUEL SUPPLY PUMP

Peter Ringwald, Renningen; Klaus Rose, Mundelsheim, and Karl Ruhl, Gerlingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

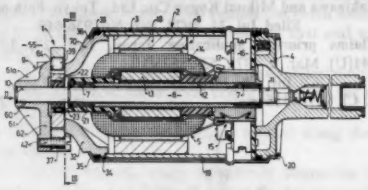
Filed Jun. 16, 1978, Ser. No. 916,415

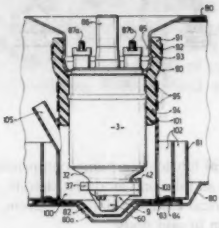
Claims priority, application Fed. Rep. of Germany, Aug. 10, 1977, 2735917

Int. Cl.³ F04B *17/00*

U.S. Cl. 417—366 **15 Claims**

1. A fuel pump assembly comprising a cylindrical casing, an electromotor in said casing, perforated front and rear cover elements for said casing, a shaft means arranged to support said electromotor with the shaft means having a terminal portion that extends through said front cover element, said terminal portion arranged to receive a further centrally apertured cover element, said last-named cover element including fuel inlet means and fuel pumping elements having at least one planar wall disposed between said respective cover elements, said front cover element for said casing being a frustum having an asymmetrical front wall and the fuel pumping elements having





oppositely disposed surfaces that are exposed to a fuel supply in a sump means.

4,231,720

PUMP FOR FLUID MEDIA HAVING DIFFERENT TEMPERATURES

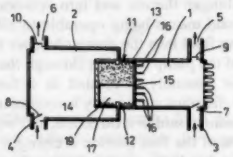
Axel König, Wolfsburg, Fed. Rep. of Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Fed. Rep. of Germany

Filed Mar. 15, 1978, Ser. No. 886,768

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1977, 2712679

Int. Cl.³ F04B *17/00;* **F03G** *7/02, 7/06*

U.S. Cl. 417—379 **17 Claims**



1. A pump for fluid media having different temperatures, comprising:

(a) means forming a first chamber for the warmer of the two media and having an inlet and an outlet as well as two respective check valves therefor;

(b) means forming a second chamber for the colder of the two media and having an inlet and an outlet as well as two respective check valves therefor;

(c) an at least partially heat conducting displacement body separating said chambers from one another and being arranged for exposure to the media in said chambers for effecting a first heat exchange between said displacement body and the fluid in one of said chambers and for effecting a second heat exchange between said displacement body and the fluid in the other of said chambers; said displacement body including means responsive to temperature changes derived from said first heat exchange for effecting deformation of said displacement body whereby

the sizes of said first and second chambers are varied; said displacement body having a first state prior to response to said temperature changes and a second, deformed state subsequent to response to said temperature changes;

(d) means for effecting in said first state of said displacement body a greater said first heat exchange than said second heat exchange and

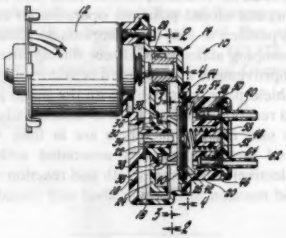
(e) means for effecting in said second state of said displacement body a greater said second heat exchange than said first heat exchange.

4,231,721

DIAPHRAGM PUMP

Rufus L. Hawk, Xenia, and Ralph D. Unterborn, Dayton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 12, 1978, Ser. No. 950,722
Int. Cl.³ F04B *43/04*
U.S. Cl. 417—413 **1 Claim**



1. In a diaphragm pump having a housing, a diaphragm peripherally mounted in said housing to define a pump chamber, and inlet and outlet means communicating with said pump chamber, the improvement comprising:

a support plate forming part of the housing having a hollow stud which projects into a second chamber of the housing defined in part by the diaphragm,

a cam follower disposed in the second chamber and secured to a central portion of the diaphragm, said cam follower having a stem reciprocably and non-rotatably mounted in the hollow stud and a pair of round ended studs radially spaced from the stem and diametrically opposite each other,

a cam-gear disposed in the second chamber and rotatably mounted on the hollow stud on an axis concentric with the cam follower and diaphragm,

said cam-gear having an annular sinusoidal cam face engaging said pair of round ended studs to reciprocate the diaphragm as the cam-gear is rotated,

compression spring means disposed in the pump chamber engaging the diaphragm to expand the pump chamber and maintain the pair of round ended studs in engagement with the cam face, and

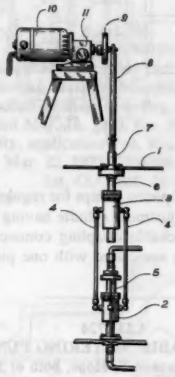
means on the support plate for mounting a motor and receiving the motor output shaft and an attached drive pinion in the second chamber for driving the cam-gear at a reduced speed.

4,231,722

MAGNETIC RECIPROCATING PUMP FOR PUMPING FLUIDS

Joachim Teichmann, No. 21 - 5, Auf dem Backenberg, 4630 Bochum 1, Fed. Rep. of Germany

Filed Mar. 20, 1978, Ser. No. 888,100
Claims priority, application Fed. Rep. of Germany, Mar. 22, 1977, 2712552
Int. Cl.³ F04B *35/04*
U.S. Cl. 417—418 **24 Claims**



1. A magnetic reciprocating pump for pumping fluids at high pressures and temperatures comprising:

(a) a tube of nonmagnetic material connected at opposite ends respectively to fluid conduit means;

(b) a piston freely reciprocable in said tube and comprising core magnetic means;

(c) one-way valve means for controlling flow of fluid through said conduit means during reciprocation of said piston;

(d) external magnetic means arranged about said tube; and

(e) means for reciprocating said external magnetic means along a path substantially parallel to said tube;

(f) said external magnetic means comprising a plurality of peripheral permanent ring magnets, said core magnetic means comprising a plurality of axially magnetized core permanent ring magnets, the number of external and internal permanent ring magnets being equal and said external permanent ring magnets surrounding said tube of nonmagnetic material;

(g) whereby reciprocation of said external magnetic means by said drive means causes said piston to reciprocate within said tube, pumping fluid through said one-way valve means and conduit means.

4,231,723

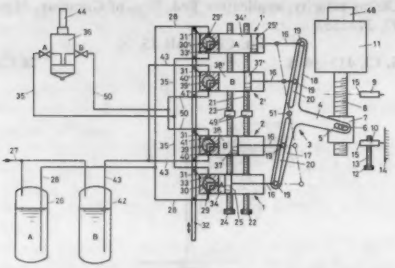
METERING AND CONVEYOR ARRANGEMENT

Walter Spühl, St. Gallen, Switzerland, assignor to Spuhl AG, Gallen, Switzerland

Filed Jul. 24, 1978, Ser. No. 927,162
Claims priority, application Switzerland, Jul. 26, 1977, 9238/77
Int. Cl.³ F04B *23/06, 49/00*
U.S. Cl. 417—429 **7 Claims**

1. A metering and conveyor arrangement for liquid to be mixed, comprising: a plurality of parallel-connected delivery pumps actuated by drive means, one pair of delivery pumps being assigned to each of said liquids; each pair of pumps comprising two piston pumps with piston rods alternately performing an intake and a discharge cycle, said piston pumps being movable relative to each other and perpendicular to said piston rods; swivel means connected to said drive means;

rocker arms located on both sides of said swivel means; each of said rocker arms being connected with one of said piston pumps and having grooves; ends of said piston rods being located and guided in said grooves; an adjustment spindle



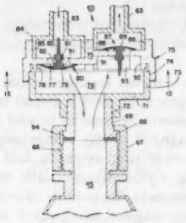
common to one pair of piston pumps for regulating said pair of piston pumps; each adjustment spindle having two parts with opposite threads; a lockable coupling connecting said parts, one spindle part being associated with one piston pump of a pair of said pumps.

4,231,724

ADJUSTABLE METERING PUMP

Henry F. Hope, and Stephen F. Hope, both of 2421 Wyandotte Rd., Huntingdon Valley, Pa. 19090

Division of Ser. No. 689,739, May 5, 1976, Pat. No. 4,090,818. This application Mar. 9, 1978, Ser. No. 884,880
Int. Cl.³ F04B *43/00, 39/00, 39/10*
U.S. Cl. 417—472 **3 Claims**



1. A valve apparatus of the type adapted for use with a reciprocating pump comprising:

an upper housing,

a lower housing connected to said upper housing and forming a plenum therebetween,

an intake connector in said upper housing adapted to receive an intake line,

an exhaust connector in said upper housing adapted to receive an exhaust line,

an inlet-outlet connector in said lower housing adapted to be connected to a pump,

a pair of flat annular valve faces on said upper housing,

a central aperture in each said valve face,

flexible mushroom shaped valve seats mounted in each said central aperture, said valve seats each having an annular disk cooperating with said flat annular valve faces forming an intake valve and an exhaust valve,

said exhaust valve having a seat outside said plenum and having a discontinuous annular ring inside said plenum surrounding the aperture under said exhaust valve face for flushing gas bubbles out of said plenum, and

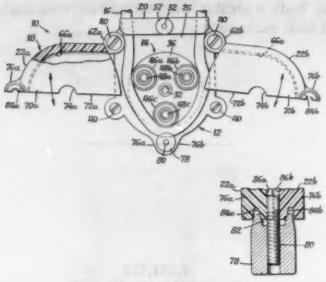
apertures through said upper housing under said annular disks of said mushroom shaped valves seats.

4,231,725

PERISTALTIC PUMP

Lawrence R. Hogan, Lake Villa, Ill., assignor to Cole-Parmer Instrument Company, Chicago, Ill.

Filed Oct. 16, 1978, Ser. No. 951,618
Int. Cl.³ F04B *43/08, 43/12*
U.S. Cl. 417—477 **16 Claims**



1. In a peristaltic pump which includes a base plate, a rotor rotatably supported on the base plate and having at least two compression surfaces rotatable therewith through a predetermined path, and a pair of reaction members pivotably mounted on said base plate for movement relative to said base plate between open positions spaced from said rotor to facilitate loading and removal of a compressible fluid flow tube relative to said rotor, and closed positions operative to maintain the flow tube in position so that said compression surfaces effect a peristaltic pumping action on said tube during rotation of said rotor; the improvement wherein each of said reaction members includes a shield plate cooperable with the shield plate on the other of said reaction members so as to substantially cover said rotor when said reaction members are in their said closed positions, and means operatively associated with said base plate and selectively cooperable with said reaction members to maintain said reaction members in their said closed positions.

4,231,726

GEAR PUMP HAVING FLUID DEAERATION CAPABILITY

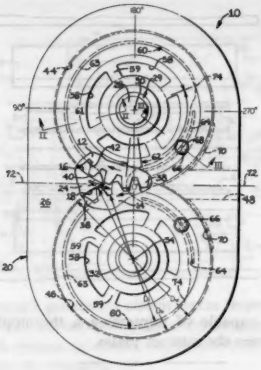
Delwin E. Cobb, Peoria, and Maurice E. Young, Washington, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jun. 22, 1978, Ser. No. 918,123
Int. Cl.³ F04C *2/18, 15/00*
U.S. Cl. 418—75 **15 Claims**

1. In a gear pump (10) having a housing (20) defining first and second intersecting cavities (16,18), and first and second intermeshing gears (12,14) having a plurality of teeth (38) and a plurality of tooth roots (42) between the teeth (38), each gear (12,14) positioned respectively in one of the first and second cavities (16,18), the improvement comprising:

air bleed passage means (60) in the housing (20) for passing entrained air collected in the fluid at said gear tooth roots (42) as a result of centrifugal force away from a preselected angular region of each of said cavities (16,18), said air bleed passage means (60) including a leading portion (61) and an adjacent trailing portion (62) in each of the angular regions, said leading portions (61) being in continuous open communication with said tooth roots (42) and having a construction starting in the region from 0° to 90°, continuing through the region from 90° to 180°, and terminating in the region from 180° to 270° relative to a zero degree position of intermeshing contact of said gears (12,14), and said trailing portions (62) being in communi-

cation with said tooth roots (42) solely through the side clearance between said gears (12,14) and said housing (20)



and having a construction juxtaposed to said leading portions (61).

4,231,727

VACUUM PRODUCING ROTARY VANE PUMP WITH SHAFT LUBRICATION

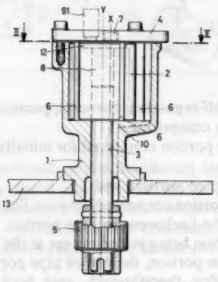
Peter Buchholz; Rolf Warnecke, both of Gifhorn, and Alfred Beier, Brunswick, all of Fed. Rep. of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Fed. Rep. of Germany

Filed Jun. 29, 1977, Ser. No. 811,172

Claims priority, application Fed. Rep. of Germany, Jul. 10, 1976, 2631152

Int. Cl.³ F04C *29/00, 25/00*

U.S. Cl. 418—76 **16 Claims**



1. A rotary pump for producing vacuum pressure comprising an integral housing including a cast member having a cylindrical chamber, a rotor in said chamber having a case-hardened cylindrical shaft pivoted without bearing members in a bore in said cast member parallel and eccentric to said chamber, said rotor having a plurality of vanes mounted slideably in outwardly extending slots of the rotor and resting against the cylindrical walls of said chambers and forming variable volume pump chambers, said vanes being urged against said walls by the pressure of hydraulic oil supplied to said slots behind each of said vanes, a part of said hydraulic oil escaping into said cylindrical chamber and promoting sealing between said vanes and the walls of each cylindrical chamber, and an axially extending groove in said housing along said bore and opening into said cylindrical chamber for the flow off of said escaped oil and for providing said oil to said shaft, wherein said rotor and said vanes have approximately the same axial length as said cylindrical chamber, wherein said housing is provided with a cover axially bounding and sealing said pump chambers from each other, said cover being provided with a suction opening, communicating with one of said pump chambers, and wherein said rotor is provided with a blind hole at its end adjacent said cover, said blind hole permanently communicating with all of said slots and with an oil delivery opening.

4,231,728

ROTARY VANE PUMP

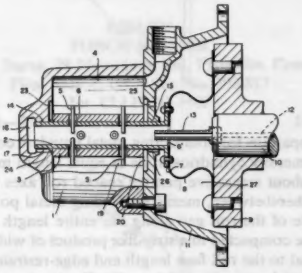
Siegfried Hertell, Radevormwald, Fed. Rep. of Germany, assignor to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Remscheid-Lennep, Fed. Rep. of Germany

Filed Mar. 14, 1978, Ser. No. 886,545

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1977, 7707853; Mar. 22, 1977, 7708908; Apr. 2, 1977, 7710603

Int. Cl.³ F04C *29/02*

U.S. Cl. 418—79 **9 Claims**



1. In a rotary vane pump of the type having a drive shaft rotating within front and rear bearings of which at least one is a sliding bearing, said drive shaft being connected to a rotor in which vanes are arranged to slide within radially formed slits, the vanes sliding with their ends projecting from the rotor along a stroke curve formed by the surrounding stator housing, said stroke curve encompassing at least one suction and pressure chamber which are arranged symmetrically to each other, and means to supply a lubricant to the elements of the pump through a hollow portion formed axially within the drive shaft, a support means for said stator housing enclosing a lubricant outlet side of the pump, and radially extending passages extending through the drive shaft and attached rotor, said passages connecting the hollow portion of said drive shaft with the chambers created between the base of the rotary vane and the slits formed in said rotor in which said vanes radially slide, the improvement comprising:

an annular compartment with a lubricant duct extension connecting the rear bearing surface in which said drive shaft rotates to said vane base chambers;

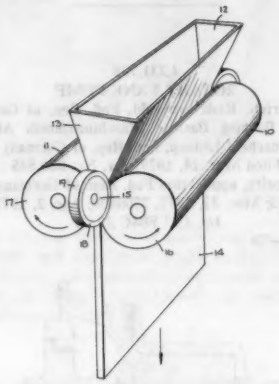
a ventilation passage connecting said annular compartment to the lubricant outlet side of said pump;

a lubricant passage formed on the suction side of said vanes by an axially extending groove which connects the front bearing surface on which said drive shaft rotates to the hollow portion of said drive shaft;

a radial groove connecting said front bearing to said vane base chambers, said radial groove being offset with respect to the bottom dead center of said vanes and opposite said axially extending groove in the direction of rotation of said pump; and

a bezel formed in either said front bearing or rotor which connects with radial groove and axially extending groove.

4,231,729
POWDER ROLLING APPARATUS
John H. Tundermann, Monroe, and Charles B. Goodrich, New York, both of N.Y., assignors to Huntington Alloys Inc., Huntington, W. Va.
Filed Oct. 9, 1979, Ser. No. 83,178
Int. Cl.[2] B22F 3/18; B30B 11/00, 3/00
U.S. Cl. 425—79 5 Claims

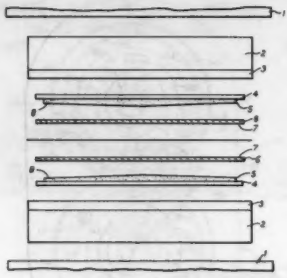


1. In apparatus for compacting metal powders comprising a pair of generally cylindrical rolls of equal length mounted for rotation about respective parallel spaced roll axes to define a roll gap therebetween, means for feeding metal powder to an intake side of the roll gap along the entire length of the roll faces to be compacted to a strip-like product of width substantially equal to the roll face length and edge-restraint means at opposite axial extremities of the rolls effective to prevent powder egress from the roll gap in a direction parallel to the roll axes,

the improvement wherein each edge restraint means comprises a wheel mounted to lie parallel to a plane containing the rolling direction and to be freely rotatable about an axis perpendicular to the roll axes, a pneumatic tire of width exceeding the roll gap mounted on the rim of the wheel, and means for urging the wheel towards the respective end-face of each roll so as to cause a portion of the surface of the pneumatic tire into frictional contact with a portion of the end-face of each roll, whereby in operation the wheel is frictionally driven by the rotating rolls and a deformed portion of the tire surface provides a mating powder seal with the roll end-faces at, and in the vicinity of, the roll gap.

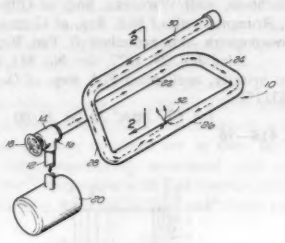
4,231,730
MOULDING VIDEO DISCS
David E. Birt, London, England, assignor to E M I Limited, Middlesex, United Kingdom
Filed Nov. 6, 1979, Ser. No. 92,062
Claims priority, application United Kingdom, Nov. 25, 1978, 46071/78
Int. Cl.[2] B29C 3/00, 17/00; B29D 17/00
U.S. Cl. 425—385 10 Claims

1. An arrangement for impressing a surface of a thermoplastics foil with a relief structure, the arrangement comprising a pair of substantially parallel mould blocks, means for applying pressure to said mould blocks, a pair of substantially parallel stamper plates mounted between the mould blocks, at least one stamper plate bearing a negative impression of said relief structure, and interposed between an adjacent mould block and stamper plate a resilient material compensator, as hereinbefore defined, wherein at least one compensator has a convex surface, the ratio of the diameter of said surface to the depth thereof being no less that 340 and no greater than 3400, which



arrangement is capable of impressing a thermoplastics foil positioned between the stamper plates.

4,231,731
MULTIFUEL SELF-REGULATING BURNER
Joseph Sharp, 337 S. Stearns Rd., Oakdale, Calif. 95361
Filed Apr. 28, 1978, Ser. No. 901,155
Int. Cl.[3] F23H 1/00
U.S. Cl. 431—38 7 Claims



1. A multifuel self-regulating burner apparatus for burning a fuel from a supply comprising:

a preheater pipe portion connected for initially receiving the fuel;

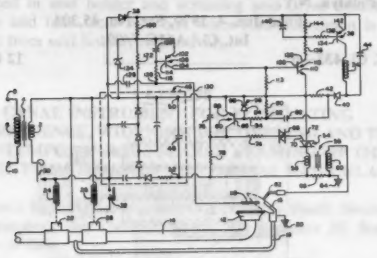
a backpressure pipe portion; and

an orifice pipe portion connected between the preheater pipe portion and the backpressure pipe portion, the backpressure pipe portion being sealed except at the connection to the orifice pipe portion, the orifice pipe portion having at least one orifice therethrough, said backpressure pipe portion being located forwardly of said orifice and said orifice being positioned for applying heat to at least the backpressure pipe portion when the fuel passing through the orifice is burned.

4,231,732
GAS BURNER CONTROL SYSTEM
Harry E. Newport, Jr., Crestwood, and Robert L. Baysinger, St. Louis County, both of Mo., assignors to Emerson Electric Co., St. Louis, Mo.
Filed Sep. 5, 1978, Ser. No. 939,414
Int. Cl.[3] F23Q 9/08
U.S. Cl. 431—46 7 Claims

1. In a gas burner control system wherein a main burner is ignited by a pilot burner, wherein spark generating circuit means is operative to ignite the pilot burner upon a call for heat and gas flow to the main burner is prevented until a pilot burner flame exists, and wherein a storage capacitor, when

sufficiently charged, is opertive upon discharge thereof to effect gas flow to the main burner, the improvement comprising circuit means connected in circuit with the storage capaci-



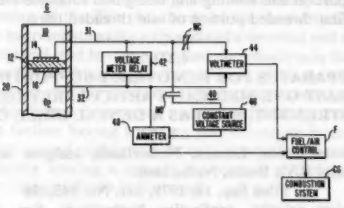
tor and the spark generating circuit means responsive to charging current of said storage capacitor for delaying energization of said spark generating circuit means until said storage capacitor is sufficiently charged.

4,231,733

COMBINED O_2/COMBUSTIBLES SOLID ELECTROLYTE GAS MONITORING DEVICE

William M. Hickam, Churchill Borough; Ching-Yu Lin, Penn Hills, and John M. Zomp, North Huntingdon, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 31, 1978, Ser. No. 911,252
Int. Cl.³ F23N *5/00*
U.S. Cl. 431—76 **6 Claims**



1. An oxygen/combustibles monitoring apparatus for generating a voltage signal indicative of the oxygen content of an excess oxygen condition in a monitored gas environment and a current signal indicative of the combustibles content of an excess combustibles content in a monitored gas environment, comprising:

an oxygen ion conductive solid electrolyte cell having first and second electrodes, said first electrode being exposed to the monitored gas environment, said second electrode being isolated from said monitored gas environment and exposed to an oxygen reference environment;

an electronic circuit means connected to said first and second electrodes, said electronic circuit means including a voltage measuring circuit and a current measuring circuit, said current measuring circuit including a constant voltage source and a current measuring means, and switching means for alternatively connecting said voltage measuring circuit and said current measuring circuit to said first and second electrode in response to a predetermined difference in oxygen partial pressure at said first and second electrodes;

said predetermined difference being set such that said voltage measuring means is operatively connected to said first and second electrodes during an excess oxygen condition of the monitored gas environment, an EMF signal generated by said solid electrolyte electrochemical cell as measured by said voltage measuring means being indicative of the oxygen content of said monitored gas environment;

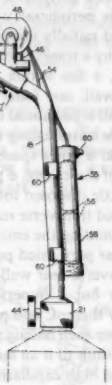
said predetermined difference being such that said current measuring circuit is connected to said first and second electrodes during an excess combustibles condition of the monitored gas environment, said constant voltage source of said current measuring circuit maintaining a preset voltage level across said solid electrolyte electrochemical cell, said predetermined difference corresponding to a change in said monitored gas environment from an excess oxygen condition to an excess combustibles condition, said solid electrolyte electrochemical cell drawing current from said constant voltage source to transfer oxygen from said oxygen reference environment at said second electrode to said first electrode to combustibly react with said excess combustibles at said first electrode, the level of current required to transfer oxygen being measured by said current measuring means, said current being indicative of the combustibles content of said monitored gas environment.

4,231,734

TORCH IGNITER

Richard W. Burns, 28 Metacomet Rd., Plainville, Conn. 06062

Filed May 4, 1977, Ser. No. 793,517
Int. Cl.³ F23Q *1/02*
U.S. Cl. 431—274 **14 Claims**



1. A torch igniter for attachment to a torch having a torch nozzle including a nozzle tip through which a fuel is passed for ignition comprising:

(a) an igniter attachment including a mounting base providing locking means to engage said attachment upon a torch nozzle adjacent the nozzle tip thereof, a motor mount, and a support housing having a wheel support carried thereon;

(b) spark generating means including a flint and wheel carried by said igniter attachment, said wheel having a hub and an abrading rim and being mounted on said wheel support for rotation of said wheel about its hub, said flint being carried by said attachment and having one end in contact with said abrading rim;

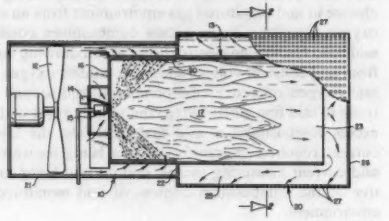
(c) motor means supported on said motor mount and including a shaft connected to said wheel for rotation thereof upon energization of said motor means; and

(d) an energy source connected to said motor by connector means including a switch which is manually operable to selectively energize said motor to rotate said wheel against said flint whereby sparks are generated by such rotation to ignite fuel passing through said nozzle tip.

4,231,735
RADIANT HEATER

Edgar S. Downs, 6530 Huntley Rd., Worthington, Ohio 43085

Filed Mar. 13, 1978, Ser. No. 885,535
Int. Cl.[3] F23D 7/00
U.S. Cl. 431—328 1 Claim

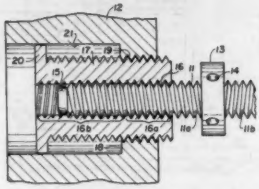


1. A radiant heater comprising an outer tubular casing closed at its forward end by a transverse imperforate wall and having a rear substantially imperforate peripheral wall section and a forward perforated peripheral wall section, an inner shell disposed with its peripheral wall concentrically within the casing but spaced radially inwardly therefrom and being substantially closed by a transverse wall at its rear end but open at its forward end, a fan within the outer casing behind said transverse rear wall, said inner shell extending from a point where its rear wall is just ahead of the fan through the imperforate section of the outer casing and on through the perforated section thereof to a point spaced from the imperforate front transverse wall of the casing, a pressure-type liquid fuel atomizing burner nozzle disposed for injecting fuel through a central opening in said transverse rear inner shell wall, said central opening also permitting the entrance of primary air, said inner shell having a rear perforated peripheral wall section which is adjacent its transverse rear wall for permitting the radial inlet of secondary air but is imperforate throughout most of its length forwardly thereof, said perforated peripheral rear wall section of the inner shell having mounted on its inner surface in covering relationship to it an annular wall section which is of high porosity and high capillarity so as to produce a combustion chamber, the space between the rear peripheral imperforate wall section of said casing and the perforated peripheral rear wall section of said inner shell forming an annular chamber for receiving secondary air from said fan which is closed at its forward end so the secondary air will flow therefrom radially inwardly through said perforated section and the covering annular high porosity and high capillarity wall section into the combustion chamber therewithin, non-atomized droplets from the nozzle that may reach it being absorbed by said wall section and burning thereof being aided by said secondary air, other fuel atomized by the nozzle producing a desired flame pattern in the forward portion of the inner shell, the products of combustion travelling axially along the interior of the tubular inner shell to heat it and then radially outwardly at its forward end and rearwardly through the annular space between the imperforate peripheral wall section of the inner shell to further heat it and the perforated peripheral wall section of the outer casing to heat it, said last-named annular space being closed at its rear end to separate it from said annular chamber so that the products of combustion will finally flow radially outwardly through the perforated peripheral wall section of the outer casing.

4,231,736
ORTHODONTIC SCREW-TYPE DEVICE AND METHOD OF MAKING SAME

Frank Reilly, Freeport, N.Y., assignor to Quanta Chemical Ltd., Brooklyn, N.Y.

Filed Jun. 4, 1979, Ser. No. 45,304
Int. Cl.[3] A61C 7/00
U.S. Cl. 433—6 12 Claims



1. An orthodontic screw-type biassing device comprising:

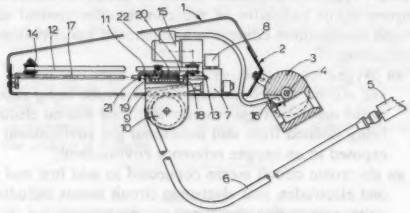
a first member having an internally threaded bore, said threaded bore comprising first and second threaded portions adjacent each other in the axial direction of said bore, said first and second threaded portions having thread roots which lie substantially on a common line, said first threaded portion having threads of given height and said second threaded portion having threads of a lesser height; and

an externally threaded screw-type member threadably engaged in said internally threaded bore of said first member, an end portion of said screw-type member being deformed so as to freely pass through said second threaded portion of said threaded bore, said deformed end portion abutting at least one thread of said first threaded portion and binding and being non-rotatable relative said first threaded portion of said threaded bore.

4,231,737
APPARATUS FOR REMOVABLY SUPPORTING AT LEAST ONE MEDICAL, PARTICULARLY DENTAL INSTRUMENT, SUCH AS A DENTAL DRILL OR THE LIKE

Johannes Groen, Loenen, Netherlands, assignor to Holland Dental B.V., Baarn, Netherlands

Filed Sep. 14, 1978, Ser. No. 945,698
Claims priority, application Netherlands, Sep. 19, 1977, 7710232
Int. Cl.[3] A61G 1/14
U.S. Cl. 433—78 7 Claims



1. An apparatus for removably supporting at least one medical, particularly dental instrument, such as a dental drill or the like, of the type having one end of an elongate flexible supply tube connected thereto, said apparatus including a box having an instrument panel, a holder for the instrument on said panel, connection means in said box for connecting the other end of said flexible supply tube, and tube retracting and releasing means comprising a tube-engaging member movably mounted in said box between a first end position retracting said tube at least partially into said box and a second end position substantially completely releasing said tube from said box, respec-

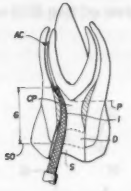
tively, reversible drive means for said tube-engaging member to move said member between said two end positions, and control means for said drive means, said control means actuating said drive means to retract said tube when said instrument is placed in said holder and actuating said drive means to release said tube from said box when said instrument is removed from said holder, respectively.

4,231,738

CANAL INSTRUMENT FOR ELIMINATING INTERFERENCE, WIDENING THE OPENING AND THE CONTEMPORANEOUS FLARED REAMING OF THE FIRST TWO-THIRDS OF THE DENTAL RADICULAR CANALS

Francesco Riitano, Corso Umberto 1°(Palazzo Tiani), Soverato (Catanzaro), and Vincenzo Spina, Via Fogliano 35, Rome, both of Italy

Filed Dec. 9, 1977, Ser. No. 859,077
Claims priority, application Italy, Dec. 9, 1976, 3607 A/76
Int. Cl.[2] A61C *5/02*
U.S. Cl. 433—102 **2 Claims**



1. A flexible canal instrument for the elimination of interference, the widening of the opening, and the contemporaneous flared reaming of the first two-thirds of the dental radicular canals, the instrument having a tip end and a terminal end distal from said tip end, and having a continuous reduction in diameter over the full working length thereof from said terminal end to said tip end, whereby the instrument becomes continuously more flexible from said terminal end toward said tip end, the instrument further having a cutting part extending from said terminal end toward said tip end for only a part of said working length, thereby leaving a smooth tip portion at the tip end thereof for easy guidance in the canal.

4,231,739

UNITARY CARTRIDGE TYPE TURBINE ASSEMBLY

Robert T. Iudica, N. Babylon, N.Y., assignor to Professional Mfg. Corp., Deer Park, N.Y.

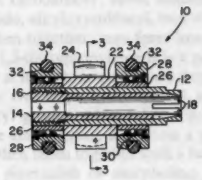
Filed Apr. 11, 1979, Ser. No. 29,710
Int. Cl.[3] A61C *1/08*
U.S. Cl. 433—126 **15 Claims**

1. A self-contained cartridge assembly free of any outer enclosure for insertion and use as a unit in and for removal from a plurality of dental handpieces in which the housing interiors are different in size and in which each housing has a fluid inlet to direct fluid into the housing and an outlet to exhaust fluid from the housing and in which the housing becomes the enclosure for said cartridge assembly when said cartridge assembly is positioned therein, said cartridge assembly comprising

sleeve shaped means of substantially the length of the housing and for engagement with a dental tool,

a turbine having impeller faces extending into the housing and for impingement thereagainst by fluid directed into the housing through the fluid inlet thereof to rotate said turbine,

said impeller being connected with said sleeve for conjoint rotation therewith,



rollable bearings fixed on said sleeve on opposite sides of said impeller,

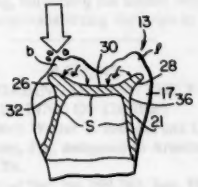
and engaging means captured on said rollable bearings extending outward therefrom for fluid tight engagement with the wall of the handpiece housing on opposite ends of said impeller to confine and direct the inlet fluid against said impeller and the faces thereof to contain the fluid from flowing outward from between said cartridge and the engagement of said engaging means with the housing.

4,231,740

DENTAL RESTORATIVE STRUCTURES

Itzhak Shoher, 50 Shlomo Hamelech St., Tel Aviv, and Aharon E. Whiteman, 13 J1 Perez St., Petach Tikvah, both of Israel

Filed Feb. 2, 1979, Ser. No. 8,944
Int. Cl.[3] A61C *13/08*
U.S. Cl. 433—208 **13 Claims**



1. A dental restoration comprising a molar pontic having a porcelain superstructure surrounding a metal framework composed of an integral assembly of metal members in an open structural arrangement having a basket-like configuration for forming a substantial occlusal concavity with porcelain disposed about, between and below said metal members.

4,231,741

MIXTURES OF OPTICAL BRIGHTENERS

Dieter Günther, Kelkheim; Rüdiger Erckel, Eppstein; Günter Rösch, Bad Soden am Taunus, and Heinz Probst, Sulzbach, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

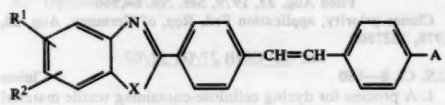
Filed Dec. 21, 1978, Ser. No. 971,735

Claims priority, application Fed. Rep. of Germany, Dec. 31, 1977, 2759217

Int. Cl.³ D06P *1/642*

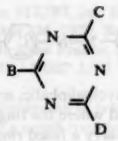
U.S. Cl. 8—571 5 Claims

1. Mixtures of optical brighteners consisting of from 0.05 to 0.95 part by weight of a compound of the formula I



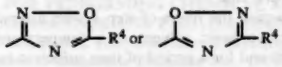
I

and of from 0.95 to 0.05 part by weight of a compound of the formula IV

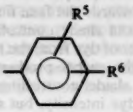


IV

in which the symbols X, R^1, R^2, A and B are defined as follows: X is oxygen or sulfur, R^1 and R^2, which may be identical or different, are hydrogen, fluorine, chlorine, phenyl, C_{1-9}alkyl, C_{1-4}alkoxy, C_{1-4}dialkylamino, acylamino, carboxy, cyano, carbonamido, mono- or di-alkylcarbonamido, carboalkoxy, sulfo, sulfonamido, mono- or di-alkyl-sulfonamido, alkyloxysulfonyl, two vicinal radicals R^1 and R^2, when taken together, are a fused benzo ring, lower alkylene or 1, 3-dioxapropylene; A is cyano, a group of the formula —$COOR^3$, $CONR_2^3$ with R^3 being hydrogen, C_{1-18}alkyl, cycloalkyl, aryl, alkylaryl, halogenaryl, aralkyl, alkoxyalkyl, halogenalkyl, hydroxyalkyl, alkylaminoalkyl, carboxyalkyl, carboalkoxyalkyl, two alkyl or alkylene, when taken together with the nitrogen atom, being a morpholino, piperidino or piperazino ring; or A is a group of the formula



in which R^4 is straight chain or branched alkyl having from 1 to 18 carbon atoms, preferably 1 to 6 carbon atoms, which may be substituted by hydroxy, halogen, lower alkoxy, dialkylamino, lower alkylmercapto, chloroaryloxy, aryloxy, arylmercapto or aryl radicals both alkyl groups contained in the dialkylaminoalkyl groups, when taken together, may form a morpholino, piperidino or piperazino ring; or R^4 is a group of the formula $—(CH_2CH_2O)_n—R$ with n being 1, 2 or 3 and R being hydrogen; lower alkyl, dialkylaminoalkoxyalkyl or alkylthioalkoxyalkyl, the alkyl groups in dialkylaminoalkoxyalkyl, when taken together, may form a piperidino, pyrrolidino, hexamethylenimino, morpholino or piperazino ring; or R^4 is a group of the formula $—(CH_2)_m—CH=CH—R$ with m being an integer of from 0 to 5, or R^4 is a radical of the formula



wherein R^5 and R^6, which may be the same or different, are hydrogen, fluorine, chlorine, phenyl, lower alkyl, lower alkoxy, C_{1-4}acylamino, carboxy, cyano, carbonamido, mono- or di-alkylcarbonamido, carboalkoxy, sulfo, sulfonamido, mono- or di-alkyl-sulfonamido, alkyloxysulfonyl, two vicinal radicals R^5 and R^6, when taken together, may form lower alkylene, a fused benzo ring or 1,3-dioxapropylene; B is a polycyclic aromatic radical having at least three condensed rings; C is amino, substituted by one or two alkyl, hydroxyalkyl, acyl or phenyl groups, and two alkyl groups, when taken together with the nitrogen atom of the amino group may form a pyrrolidino or piperidino ring or, when taken together with a further nitrogen or oxygen atom, a piperazino or morpholino ring; or C is alkoxy, hydroxyalkyl, acyloxy, alkylthio or carbalkylmercapto; D independent from C is defined as C and may further stand for a chlorine atom.

4,231,742

MANUFACTURE AND USE OF HEAT TRANSFER PRINTINGS

Dieter Clausen, Baldham, and Albert Uhlemayr, Forstinning, both of Fed. Rep. of Germany, assignors to Michael Huber Munchen, GmbH, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 855,530, Nov. 28, 1977, abandoned. This application Feb. 28, 1979, Ser. No. 16,215

Claims priority, application Fed. Rep. of Germany, Dec. 2, 1976, 2654651

Int. Cl.³ D06P *1/08*

U.S. Cl. 8—470 11 Claims

1. The new use of a printing ink for thermo-transfers, said ink consisting essentially of at least one sublimable dye, at least one rapidly UV hardenable binder having polymerizable ethylenic unsaturation and a UV polymerization initiator, comprising printing said ink by the offset or letter printing method onto a heat-transfer backing, hardening the binder with UV radiation, and subsequently heat-transferring the print to a textile fabric.

4,231,743

PROCESS FOR SHADING DURING THE VAPOR PHASE DYEING OF CARPET

Mervin R. Buckwalter; Walter T. Bulson, and Leonard N. Ray, Jr., all of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Continuation-in-part of Ser. No. 694,763, Jun. 10, 1976, Pat. No. 4,181,497. This application Apr. 16, 1979, Ser. No. 30,450

Int. Cl.³ D06P *5/12*

U.S. Cl. 8—471 3 Claims

1. A process for making a decorative carpet through the use of sublimable dyes comprising the steps of:

(a) printing sublimable dyes on a porous transfer sheet,

(b) preparing a carpet product which has on one side thereof carpet yarn forming the face fiber yarns,

(c) placing the transfer sheet adjacent the face fiber yarns so that the transfer sheet with the sublimable dyes printed thereon will be adjacent the face fiber yarns of the carpet product,

(d) positioning a shade controlling means which is a porous sheet adjacent a portion of the transfer sheet to reduce the air flow permeability through the transfer sheet and carpet product so as to yield dye, but at a reduced intensity in those areas where the shade controlling means exists, and

(e) transferring the sublimable dyes from the transfer sheet to the carpet face yarns by the application of a directional flow, heated gaseous medium, passing through the trans-

fer sheet and the carpet product in the direction from the transfer sheet towards the face fiber yarns with the areas not containing the shade controlling means resulting in full color transfer of dye from the transfer sheet to the face fiber yarns of the carpet product and with those areas containing the shade controlling means there being a diminishing of dye intensity, but still dyeing, on the face fiber yarns of the carpet product, resulting in partial color transfer of dye to the face fiber yarns to give a shade difference between the areas with and those without the shade controlling means.

4,231,744

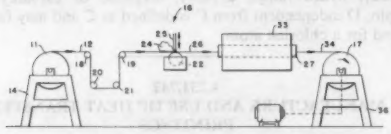
PROCESS FOR DYEING CLOSELY CONSTRUCTED NON-TUFTED TEXTILE MATERIALS AND PRODUCTS PRODUCED THEREBY

Lorence M. Moot, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Jun. 15, 1978, Ser. No. 915,822

Int. Cl.[2] D06P 5/00

U.S. Cl. 8—495 **12 Claims**



1. In a process for improving the sharpness of a pattern of dye applied to closely constructed non-tufted textile materials characterized as having a weight of at least about 4 ounces per square yard with a jet dyeing apparatus including conveying means for transporting the textile, jet orifices for delivering dye in a pattern to said textile material and control means for supplying data to control the operation of the application of dye from the jet orifices to the textile material, said process including the sequential steps of modifying the textile material prior to dyeing of same with the jet dyeing apparatus by applying an aqueous admixture containing an effective minor amount of a substantially oil and water repellent fluoropolymer to the textile material to provide from about 0.20 to about 2.5 weight percent of the fluoropolymer on the textile material, heating the fluoropolymer treated textile material to a temperature effective to dry the textile material and cure the fluoropolymer thereby providing a fluoropolymer modified textile material, dyeing the fluoropolymer textile material, and recovering a resulting dyed fluoropolymer modified textile material, the improvement comprising incorporating into the aqueous admixture containing the fluoropolymer from about 0.001 to about 0.01 weight percent of a fluorosurfactant, said fluorosurfactant containing a F_3CCF_2CH— moiety.

4,231,745

PROCESS FOR PAD-DYEING AND PRINTING FABRICS MADE OF CELLULOSE AND/OR REGENERATED MODIFIED CELLULOSE AND OPTIONALLY POLYESTER FIBERS

Erich Feess, Hofheim, and Friedrich Reinhardt, Neuenhain, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 741,400, Nov. 12, 1976, abandoned.

This application Mar. 16, 1978, Ser. No. 887,363

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1976, 2551432

Int. Cl.[3] D06P 3/82, 3/54

U.S. Cl. 8—552 **14 Claims**

1. In a process for printing or pad-dyeing fabrics consisting of fibers of cellulose or regenerated cellulose or mixtures of these fibers with an aqueous composition containing a disperse dyestuff, the improvement which comprises printing or pad-dyeing said fabric with a printing paste or pad-dyeing liquor containing as a thickening agent a synthetic polymer which is an addition polymer containing recurring units of at least one low molecular weight ethylenically unsaturated mono- or dicarboxylic acid, said polymer having free carboxy groups.

4,231,746

DYEING OF CELLULOSE-CONTAINING TEXTILE MATERIAL AND NOVEL DYES FOR USE THEREIN

Johannes Dehnert, and Werner Juenemann, both of Ludwigshafen, Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

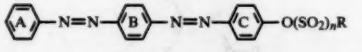
Filed Aug. 22, 1979, Ser. No. 68,566

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1978, 2837500

Int. Cl.[3] C09B 27/00, 31/02

U.S. Cl. 8—680 **9 Claims**

1. A process for dyeing cellulose-containing textile material which comprises contacting a cellulose-containing textile material with water and an oxyethylene or oxypropylene compound, thereby to swell the cellulose fibers of said textile material and dyeing said swollen fibers with a dye of formula I



I

where R is an aliphatic, cycloaliphatic, araliphatic or aromatic radical and n is 0 or 1, and where the rings A, B and C may be substituted and/or may carry a fused ring.

4,231,747

SHRINKPROOFING WOOL WITH COPPER SALTS OF CARBOXYLIC ACIDS

Nathan H. Koenig, Albany, and Mendel Friedman, Moraga, both of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jul. 16, 1979, Ser. No. 57,858

Int. Cl.[3] D06M 13/00, 3/02, 13/20, 13/12

U.S. Cl. 8—127.6 **13 Claims**

1. A process for shrinkproofing proteinaceous fibers, which comprises

(a) contacting the fibers with an aqueous solution of a cupric salt of a carboxylic acid containing from 2 to 18 carbon atoms at a temperature and concentration and for a period of time sufficient to enhance the shrinkage properties of the fibers, and

(b) contacting the fibers of step a with a semipolar, water miscible organic solvent at a temperature and in an amount and for a period of time sufficient to shrinkproof the fibers.

4,231,748

AZO DYESTUFFS

Herbert Hugi, and Gerhard Wolfrum, both of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

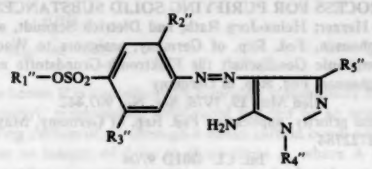
Filed Nov. 22, 1978, Ser. No. 962,960

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1977, 2752424

Int. Cl.[3] D06P 1/18; C09B 29/01

U.S. Cl. 8—668 **2 Claims**

1. Disperse azo dyestuffs of the formula



wherein

R_1'' represents phenyl, tolyl, or chlorophenyl,
R_2'' and R_3'' represent chlorine,
R_4'' represents phenyl and
R_5'' represents methyl.

4,231,749

DYEING PROCESS USING A SEQUESTRATING AGENT

Jean Balland, Chateaurenault, France, assignor to Manufacture de Produits Chimiques Protex Societe Anonyme, Paris, France

Continuation of Ser. No. 817,797, Jul. 21, 1977, abandoned. This application Apr. 24, 1979, Ser. No. 33,010
Claims priority, application France, Jul. 23, 1976, 76 23120
Int. Cl.³ D06P *1/10, 1/667*
U.S. Cl. 8—584 **3 Claims**

1. In a process for the dyeing of textile fibers in an aqueous dyeing bath containing a metal-containing dyestuff sensitive to demetallization by a sequestrating agent at a temperature and for a period sufficient to transfer said dyestuff to said textile fibers, wherein said bath contains at least one sequestrable metal in the form of a metal of said dyestuff, an alkaline-earth metal or a heavy-metal impurity, the improvement which comprises introducing into said bath a sequestrating agent in the form of a hydroxy-(C_1 to C_4)-alkane phosphonic acid salt capable of sequestrating said impurity without affecting the physical-chemical characteristics of said dyestuff, said salt being selected from the group which consists of the sodium, potassium and lithium salts of hydroxyethane-1,1-di-phosphonic acid and 1-hydroxypropane-1,1,3-triphosphonic acid.

4,231,750

METHODS FOR PERFORMING CHEMICAL ASSAYS USING FLUORESCENCE AND PHOTON COUNTING

Robert M. Dowben, Dallas, Tex., and James R. Bunting, Boston, Mass., assignors to Diagnostic Reagents, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 634,797, Nov. 24, 1975, abandoned. This application Dec. 13, 1977, Ser. No. 860,168
Int. Cl.² G01N *33/16, 31/14, 21/22*
U.S. Cl. 23—230 B **22 Claims**

1. In a competitive binding assay method for determining the concentration of a substance in a fluid sample which comprises providing a light emitting tracer compound and detecting the amount of tracer to determine the concentration of the substance the improvement comprising detecting said tracer by a photon counting method which (1) discriminates the photons emitted by said tracer from noise and non-specific light by subtracting the counts emitted by a tracer free sample and, (2) discriminates the photons emitted by such tracer from the quenching effects of the sample by counting only those photons of a predetermined pulse height.

4,231,751

NOVEL METHOD OF TESTING A CHARGE CALCINED ALUMINA TO DETERMINE ITS SUITABILITY FOR USE IN HYDROCARBON CONVERSION

Leon F. Koniz, Poughkeepsie, and John H. Estes, Wappingers Falls, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Division of Ser. No. 887,392, Mar. 16, 1978, Pat. No. 4,171,329, which is a continuation-in-part of Ser. No. 704,003, Jul. 9, 1976, abandoned. This application Jan. 5, 1979, Ser. No. 1,235
Int. Cl.² G01N *21/04, 31/02*
U.S. Cl. 23—230 R **2 Claims**

1. The method of testing a charge calcined alumina to determine its suitability for use in a hydrocarbon conversion process including steam dealkylation, and in particular its ability to effect hydrocarbon conversion to desired products without substantial formation of less desired products, which comprises:

(i) mixing said charge calcined alumina with an excess of water, thereby forming an aqueous mixture;
(ii) heating said aqueous mixture;
(iii) digesting said heated aqueous mixture during which opertion the aqueous mixture becomes opaque in accordance with the formation, by rehydration, of beta alumina trihydrate, which latter is observed as suspended material while the nonsuspended material is observed as a layer in the lower portion of the aqueous mixture; and
(iv) determining the opacity of the upper portion of the aqueous mixture including the suspended material—a high opacity signifying unsuitability of the charge calcined alumina for use in steam dealkylation in which hydrocarbon conversion is effected to form desired products without substantial formation of less desired products, and a low opacity signifying a higher degree of suitability.

4,231,752

METHOD OF DETERMINING SALT WATER IN OILS

Edward J. Moore, and Michael Sedlak, both of Woodbury, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 28, 1979, Ser. No. 16,247
Int. Cl.³ G01N *33/26, 33/18, 31/02, 33/52*
U.S. Cl. 23—230 HC **10 Claims**

1. An improved method for determining the presence of salt water in a lubricating oil which comprises the steps of extracting the oil with an aqueous medium and contacting said aqueous medium containing chloride ion with a composite comprising silver chromate deposited on an adsorbent, the improvement whereby the aqueous medium used to extract the chloride ion is a combination of aqueous alkali metal or ammonium salt, an aliphatic monohydric alcohol and a halohydrocarbon or mixed halohydrocarbons.

4,231,753

CONTROL OF A CRACKING FURNACE

William S. Stewart, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 22, 1979, Ser. No. 22,909
Int. Cl.² G06G *7/58;* **G06F** *15/18*
U.S. Cl. 23—230 A **47 Claims**

19. A method for operating a cracking furnace comprising the steps of:

combining a feed stream provided to said cracking furnace with a diluent fluid;
supplying fuel to said cracking furnace, the combustion of said fuel supplying heat to said cracking furnace;
removing a gaseous mixture, containing the cracked components of said feed stream and containing said diluent fluid, from said cracking furnace;
establishing a first signal representative of a prediction of the heat required by said cracking furnace to maintain a desired percent conversion;

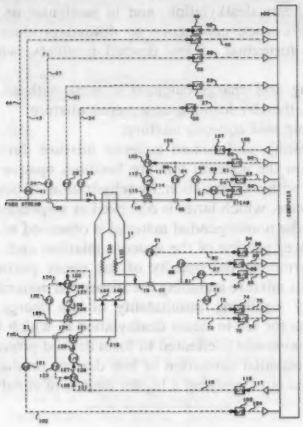
establishing a second signal representative of said desired percent conversion;

establishing a third signal representative of the actual percent conversion;

comparing said second signal and said third signal and establishing a fourth signal responsive to the difference between said second signal and said third signal;

combining said first signal and said fourth signal to establish a fifth signal representative of a corrected prediction of the heat required by said cracking furnace to maintain said desired percent conversion;

establishing a sixth signal representative of the heating value of said fuel;



establishing a seventh signal in response to said fifth signal and said sixth signal, said seventh signal being representative of the flow rate of said fuel required to supply the heat required by said cracking furnace to maintain said desired percent conversion;

establishing an eighth signal representative of the actual flow rate of said fuel;

comparing said seventh signal and said eighth signal and establishing a ninth signal responsive to the difference between said seventh signal and said eighth signal; and

manipulating the flow rate of said fuel in response to said ninth signal.

4,231,754

CHEMILUMINESCENT ANALYTICAL DEVICE

Paul O. Vogelhut, Mishawaka, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Filed May 23, 1979, Ser. No. 41,682

Int. Cl.³ G01N *21/76, 33/50*

U.S. Cl. 23—230 R **12 Claims**

1. A test device for determining an analyte in a sample comprising at least one layer incorporated with a first reagent system responsive to the presence of said analyte to produce a reaction product and at least one luminescent layer having a second reagent system responsive to the presence of said reaction product to produce luminescence, and in which there is a pH gradient between the first reagent system layer and the luminescent layer.

11. A method for determination of a constituent in a sample which comprises contacting the sample with the device of claim **1** and observing any detectable chemiluminescent response.

4,231,755

PROCESS FOR PURIFYING SOLID SUBSTANCES

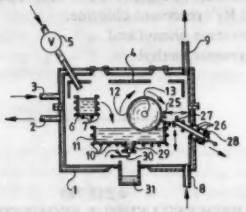
Heinz Herzer; Heinz-Jorg Rath, and Dietrich Schmidt, all of Burghausen, Fed. Rep. of Germany, assignors to Wacker-Chemitronic Gesellschaft für Elektronik-Grundstoffe mbH, Burghausen, Fed. Rep. of Germany

Filed May 19, 1978, Ser. No. 907,442

Claims priority, application Fed. Rep. of Germany, May 20, 1977, 2722784

Int. Cl.³ B01D *9/04*

U.S. Cl. 23—293 R **5 Claims**



1. In a process for purifying semiconductor silicon by melting and subsequent resolidification, the improvement comprising the steps of:

forming a melted bath of the silicon to be purified at a temperature between 1430° and 1500° C.;

disposing a roller in the bath to a depth of between 0.01 to 0.3 times the diameter of the roller;

cooling the roller internally to a temperature between 800° and 1200° C.;

rotating the cooled roller in the melted silicon to form a solidified silicon film, wherein the residence time of the roller surface in the melted silicon, measured in minutes, is 0.0025 to 0.5 times the numerical value for the roller diameter;

remelting the silicon film formed on said roller at a distance of 0.1 to 0.5 d. π from the surface of the melt, measured on the circumference of the roller, wherein d. is the diameter of the roller; and

collecting the remelted silicon in an appliance.

4,231,756

GASOLINE AND PETROLEUM FUEL SUPPLEMENT

Samuel B. King, 2985 McGavach Pike, Nashville, Tenn. 37214

Filed May 11, 1979, Ser. No. 38,288

Int. Cl.² C10L *1/18, 1/16*

U.S. Cl. 44—53 **4 Claims**

1. A fuel supplement comprising 250 to 1500 ml of methyl alcohol, 100 to 800 ml of xylene, 250 to 1500 ml of ethyl alcohol, 200 to 800 mg of potassium hydroxide and 200 to 800 mg of sodium hydroxide.

4,231,757

NITRO PHENOL-AMINE CONDENSATES, METHODS OF MAKING SAME, FUELS AND ADDITIVE CONCENTRATES CONTAINING THEM

Kirk E. Davis, Euclid, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

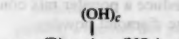
Filed Jun. 2, 1978, Ser. No. 911,728

Int. Cl.² C10L *1/22*

U.S. Cl. 44—63 **45 Claims**

1. A nitrogen-containing composition substantially free of nitro groups made by condensing:

(A) at least one nitro phenol represented by the formula



wherein R is a substantially saturated, substantially hydrocarbyl, nonaromatic substituent bonded to an aromatic ring carbon of Ar through a direct carbon bond; a is zero or an integer of 1 up to three times A where A is the number of aromatic nuclei present in Ar; b and c are each independently integers of 1 up to three times A with the proviso that the sum a+b+c does not exceed the unsatisifed valences of Ar; and Ar is an aromatic moiety having 0 to 3 optional substituents, Opt, selected from the group consisting of halogen, —L, —OL, —CN, —NH_2, —NHL, —NL_2, —C(O)OL where L is a lower alkyl group of 1 to 7 carbon atoms and combinations of two or more of said optional substituents with

(B) at least one amine having at least one hydrogen atom directly bonded to a nitrogen atom or an oxygen atom.

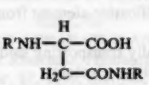
4,231,758

MOTOR FUEL COMPOSITION

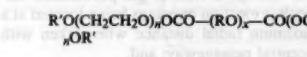
Mahmoud S. Kablaoui, Wappingers Falls, N.Y., assignor to Texaco Inc., White Plains, N.Y.

Filed Jun. 21, 1976, Ser. No. 698,436
Int. Cl.³ C10L *1/22*
U.S. Cl. 44—71 **9 Claims**

1. A motor fuel composition comprising a mixture of hydrocarbons in a gasoline boiling range containing from about 0.001 to 5.0 weight percent of a substituted asparagine having the formula:



in which R and R′ each represent a secondary or a tertiary alkyl or alkylene radical having from about 7 to 20 carbon atoms and from about 0.01 to 0.05 volume percent of a carbonic acid ester having the formula:



in which R is a divalent aliphatic hydrocarbon radical containing 2 to 3 carbon atoms, R′ is hydrogen or an aliphatic hydrocarbon radical containing 2 to 18 carbon atoms, x has a value from 1 to 4 and n has a value from 0 to 4.

4,231,759

LIQUID HYDROCARBON FUELS CONTAINING HIGH MOLECULAR WEIGHT MANNICH BASES

John H. Udelhofen, Wheaton, and Roger W. Watson, Batavia, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Mar. 12, 1973, Ser. No. 340,016
Int. Cl.³ C10L *1/22*
U.S. Cl. 44—75 **9 Claims**

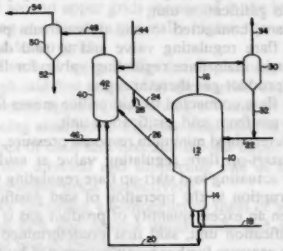
1. A liquid hydrocarbon combustion fuel containing an amount sufficient to impart improved detergency properties thereto of an additive composition comprising the condensation product of (1) a high molecular weight sulfur-free alkyl-substituted hydroxyaromatic compound wherein the alkyl group has a number average molecular weight of from about 600 to about 3,000, (2) an amine which contains an amino group having at least one active hydrogen atom, and (3) an aldehyde, wherein the respective molar ratio of reactants is 1:0.1–10:0.1–10.

4,231,760

PROCESS FOR GASIFICATION USING A SYNTHETIC CO_2 ACCEPTOR

Michael S. Lancet, and George P. Curran, both of Pittsburgh, Pa., assignors to Continental Oil Company, Stamford, Conn.

Filed Mar. 12, 1979, Ser. No. 20,005
Int. Cl.³ C10J *3/12, 3/54*
U.S. Cl. 48—197 R **1 Claim**



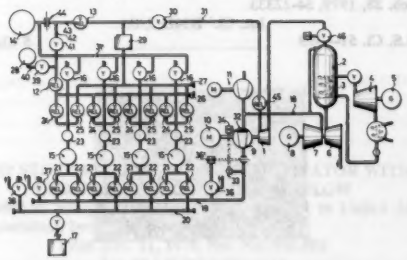
1. In a process for producing a synthesis gas by reacting a carbonaceous fuel with water in the presence of a CO_2 acceptor comprising calcium oxide to produce a synthesis gas rich in hydrogen with at least a portion of the carbon dioxide so produced being reacted with said calcium oxide to produce calcium carbonate and to provide sufficient heat to maintain a desired reaction temperature, the improvement comprising; using as the CO_2 acceptor, a CO_2 acceptor consisting essentially of calcium oxide supported in a refractory carrier matrix, said carrier having the general formula $Ca_5(SiO_4)_2CO_3$ wherein said calcium oxide is present in an effective amount up to about 50 weight percent, calculated as CaO based on the weight of the acceptor.

4,231,761

FLARE GAS LIMITING APPARAUS FOR COAL GASIFICATION UNIT

Helmut Meyer-Kahrweg, Wuppertal, Fed. Rep. of Germany, assignor to Steag A.G., Essen, Fed. Rep. of Germany

Filed Jun. 23, 1978, Ser. No. 918,437
Claims priority, application Fed. Rep. of Germany, Jun. 27, 1977, 2728826
Int. Cl.² F17D *3/00*
U.S. Cl. 48—192 **5 Claims**



1. A gas flare pollution reducing device comprising:

a coal pressure gasification unit having inlet means and exhaust means, said inlet means for introducing gasification agents into said gasification unit, said exhaust means for emitting product gas formed by combining gasification agents and coal in said gasification unit;

pressure reducing means, connected to said inlet means of the pressure gasification unit, for reducing the pressure of

gasification agents into said gasification unit after an interruption in the operation of said gasification unit;

a start-up flare regulating valve having an upstream port and a downstream port, said upstream port connected to said exhaust means of said gasification unit;

a main flare regulating valve having an upstream port and a downstream port, said upstream port connected to said exhaust means of said gasification unit;

a start-up flare connected to said downstream port of said start-up flare regulating valve for burning product gas from said gasification unit;

orifice means, connected to said downstream port of said start-up flare regulating valve and to said downstream port of said main flare regulating valve, for limiting the flow of product gas therethrough;

a main gas flare connected to said orifice means for burning product gas from said gasification unit;

a first predetermined minimum response pressure, connected to said start-up flare regulating valve at said upstream port, for actuating said start-up flare regulating valve after an interruption in the operation of said gasification unit and when an excess quantity of product gas is formed in said gasification unit, said first predetermined minimum response pressure further being determined by the critical pressure ratio for the product gas across said start-up flare regulating valve; and

a second predetermined minimum response pressure connected to said main flare regulating valve at said upstream port for actuating said main flare regulating valve after an interruption in the operation of said gasification unit and when an excess quantity of product gas is formed in said gasification unit, said second predetermined minimum response pressure further being determined by at least 90 percent of the critical pressure ratio for the product gas across said main flare regulating valve, whereby when said start-up flare regulating valve and said main flare regulating valve are opened and said pressure reducing means are opened after an interruption in the operation of said gasification unit the product gas is permitted to flow from the gasification unit to said start-up gas flare and to said main gas flare to be burned therein thereby reducing environmental pollution.

4,231,762

METHOD OF PRODUCING A SINTERED DIAMOND COMPACT

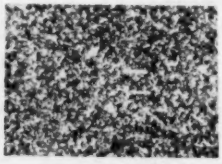
Akio Hara, and Shuji Yazu, both of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Division of Ser. No. 902,812, May 4, 1978, Pat. No. 4,171,973. This application Dec. 13, 1978, Ser. No. 968,970

Claims priority, application Japan, May 4, 1977, 52-51381; Feb. 28, 1979, 54-22333

Int. Cl.³ B24D *3/06*

U.S. Cl. 51—309 **5 Claims**



1. A method of producing a sintered compact for use in a cutting tool comprising:

pulverizing a diamond powder into a particle size finer than one micron by using cemented carbide balls and a pot having a cemented carbide lining, the cemented carbide being selected from the group of WC base cemented carbide and (MoW)C base cemented carbide;

mixing the diamond powder with a powder abraded from the balls and pot, which is also pulverized into a particle size finer than one micron to produce a powder mix containing 95 to 20 volume % of the diamond powder;

degassing the powder mix in a vacuum at temperatures over 300° C; and

hot-pressing the powder mix under high pressure at high temperature within the stable range of the diamond powder.

4,231,763

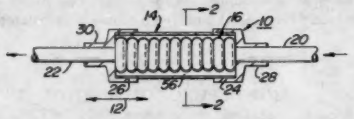
EXHAUST GAS POLLUTION CONTROL SYSTEM

C. Robert Baisden, 11127 Willow Bottom Dr., Columbia, Md. 21044

Filed Aug. 29, 1978, Ser. No. 937,787

Int. Cl.³ B01D *1/00*

U.S. Cl. 55—1 **14 Claims**



10. A method for reducing exhaust gas audio levels, particulate and chemical waste materials emitted to the atmosphere subsequent to exhaust gases passing from a combustion chamber, including the steps of:

(a) introducing said exhaust gases into a central passageway of an exhaust gas purification element having an open contour donut shape;

(b) directing a portion of said exhaust gases internal said exhaust gas purification element from said central passageway;

(c) circumferentially transporting said exhaust gases within said gas purification element;

(d) increasing the velocity of said portion of said exhaust gases directed into said exhaust gas purification element when taken with respect to a velocity of said exhaust gas within said central passageway;

(e) ejecting particulate matter through particulate ejection openings formed through a wall of gas purification element, said particulate ejection openings being located at a substantially maximum radial distance when taken with respect to said central passageway; and,

(f) reintroducing a portion of said exhaust gases within said exhaust gas purification element to said central passageway through gaseous ejection openings formed through said wall of said gas purification element, said gaseous ejection openings being located substantially adjacent said central passageway.

4,231,764

SYSTEM FOR REMOVING ORGANIC CONTAMINANTS FROM AIR

Manlio M. Mattia, 1208 Waterford Rd., West Chester, Pa. 19380

Filed Sep. 25, 1978, Ser. No. 945,327

Int. Cl.³ B01D *53/08*

U.S. Cl. 55—28 **13 Claims**

1. A continuous process for removing low concentration organic vapor contaminants from contaminated air and for recovering a portion of said organic vapor contaminants, comprising the steps of:

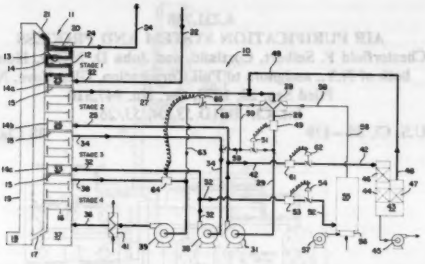
passing said contaminated air through a bed of moving adsorbent material to provide contaminant bearing adsorbent material,

passing a first hot partially inert regenerating gas through said contaminant bearing adsorbent material to provide a first contaminant rich partially inert gas and to provide

partially contaminated contaminant bearing adsorbent material,

passing a second hot partially inert regenerating gas through said partially contaminated contaminant bearing adsorbent material to provide substantially regenerated adsorbent material and a second contaminant rich partially inert gas,

cooling said substantially regenerated adsorbent material to provide said adsorbent material,



diverting a portion of said first contaminant rich partially inert gas through a condenser to provide a less contaminated contaminant rich partially inert gas and to recover a portion of said contaminants,

returning said less contaminated contaminant rich partially inert gas to said first contaminant rich partially inert gas from which it was diverted, and

mixing said partially inert gases.

4,231,765

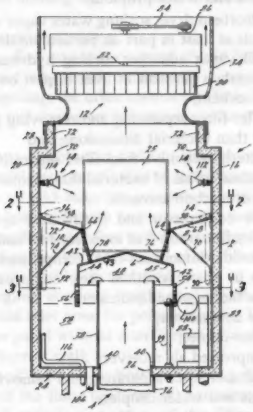
AIR CLEANING APPARATUS AND METHOD

Morton J. Scott, 6472 Riverdale, Hamburg, Mich. 48139

Filed Apr. 17, 1979, Ser. No. 30,719

Int. Cl.³ B01D *47/12*; F24C *15/20*; F23J *15/00*

U.S. Cl. 55—90 **10 Claims**



1. An apparatus for ventilating and cleaning air having smoke, grease and the like as contaminants therein, comprising:

a housing having side walls, an air inlet opening and an air exhaust opening;

an air inlet duct communicating with said air inlet opening and having an end portion extending a substantial distance into said housing;

means for moving air through said housing:

first and second lower grids positioned in the interior of said housing;

a lower baffle for directing air through said lower grids having a generally inverted V-shaped cross-section with downwardly extending side flanges, said lower baffle being located in opposition to said end portion of said inlet duct and each of said side flanges being spaced from said inlet duct and supporting one of said first and second lower grids;

first and second upper grids supported in the interior of said housing at a location generally higher than said first and second lower grids;

first and second upper baffles for respectively directing air through said first and second upper grids, each of said first and second upper baffles having a V-shaped cross-section and being attached to opposite side walls of said housing, the apex of each said first and second upper baffles being inwardly directed and supporting one of said first and second upper grids respectively;

means for providing a homogeneous sheet of water on each of said first and second upper grids and said first and second lower grids; and

each of said first and second upper grids and said first and second lower grids comprising a foraminous sheet member located generally transverse to the flow of air directed therethrough and having means associated with each perimeter edge portion thereof for preventing flow of air around said sheet member.

5. A method of removing contaminates and other foreign matter from air by passing said air through a housing and cleaning said housing, said method comprising the steps of cyclically:

(A) providing a sheet of water interior of said housing, said sheet of water being drawn from a reservoir located in the bottom portion of said housing, and said sheet of water flowing downwardly to sequentially form a first water curtain and a second water curtain spaced therefrom, said second water curtain flowing into said reservoir; and passing air sequentially through said second water curtain and said first water curtain;

(B) discontinuing step (A), draining water from said reservoir and cleaning the interior surfaces within said housing by spraying hot water thereagainst, said hot water flowing downwardly into said reservoir and being continuously drained therefrom; and

(C) discontinuing step (B) and filling said reservoir with water.

4,231,766

TWO STAGE ELECTROSTATIC PRECIPITATOR WITH ELECTRIC FIELD INDUCED AIRFLOW

Wendell P. Spurgin, Cincinnati, Ohio, assignor to United Air Specialists, Inc., Cincinnati, Ohio

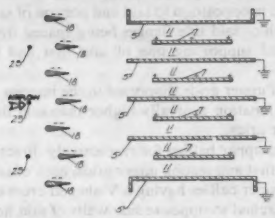
Filed Dec. 11, 1978, Ser. No. 968,100

Int. Cl.³ B03C *3/08, 3/12*

U.S. Cl. 55—138 **17 Claims**

1. In an electrostatic precipitator air cleaner of the type having a plurality of spaced collecting plates for collecting charged particles, the spaces between said plates forming passageways having an inlet end and an outlet end, one or more ionizers positioned adjacent said inlet end, and means for charging said ionizers to a relatively high first electrical potential, the improvement comprising accelerator means positioned

between said ionizers and said inlet end for producing a relatively strong electric field in the region between said ionizers



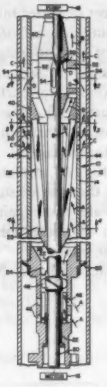
and said inlet end tending to move air through said passageways and to charge particles aspirated by said moving air.

4,231,767

LIQUID-GAS SEPARATOR APPARATUS

Roy M. Acker, Los Angeles, Calif., assignor to TRW Inc., Cleveland, Ohio

Filed Oct. 23, 1978, Ser. No. 953,598
Int. Cl.[3] B01D *19/00*
U.S. Cl. 55—186 **9 Claims**



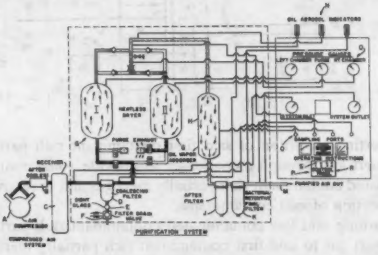
9. Liquid-gas separator apparatus comprising a housing having an upwardly extending wall, a convoluted screen in said housing having an interior surface and an exterior surface, the exterior surface facing said wall, said screen having a lower end spaced from said wall, said screen extending upwardly and outwardly from said lower end toward said wall and having an upper end sealed to said wall, the housing having a liquid flow path which extends upwardly from the interior surface of said screen, the screen convolutions having successive peaks and troughs defining grooves extending upwardly along the screen from the lower end of the screen to the upper end of the screen, inlet means near the lower end of the screen for directing a liquid-gas mixture into the space between said screen and said wall and for constraining said mixture to flow upwardly along the exterior surface of the screen, and vent means near the upper end of the screen for venting gas from the space between the screen and said wall, the mesh size of the screen being predetermined so that liquid passes through the screen and gas passes along the exterior surface of the screen, especially in the grooves, and is vented through the vent means.

4,231,768

AIR PURIFICATION SYSTEM AND PROCESS

Chesterfield F. Seibert, Cortland, and John D. Miller, Homer, both of N.Y., assignors to Pall Corporation, Glen Cove, N.Y.

Filed Sep. 29, 1978, Ser. No. 947,310
Int. Cl.[3] B01D *53/04, 53/26*
U.S. Cl. 55—179 **38 Claims**



1. An air purification system capable of removing substantially quantitatively commonly occurring gaseous liquid and solid contaminants, including water and hydrocarbons, from compressed air, thereby ensuring hydrocarbon-free moisture-free and particulate-and microbial-solid-contaminant-free compressed air, ready for application in pharmaceutical uses, comprising, in combination, and in the sequence indicated:

(1) a coalescer filter separating and removing hydrocarbon droplets and water droplets;

(2) an adsorbent dryer sorbing water vapor and hydrocarbon aerosols at least in part on particulate desiccant;

(3) an oil vapor adsorber sorbing hydrocarbon vapor and hydrocarbon aerosols at least in part on particulate activated sorbent;

(4) an after-filter separating and removing particulate solids larger than bacterial dimensions; and

(5) a bacterial-retentive final filter separating and removing particulate solids of bacterial dimensions and any remaining hydrocarbon aerosols.

38. A air compressor and purification system capable of delivering hydrocarbon-free moisture-free and particulate- and microbial-solid-contaminant-free compressed air, ready for application in pharmaceutical uses, comprising, in combination, and in the sequence indicated:

(1) an air compressor;

(2) an after-cooler;

(3) a compressed air receiver;

(4) a coalescer filter separating and removing hydrocarbon droplets and water droplets;

(5) an adsorbent dryer sorbing water vapor and hydrocarbon aerosols at least in part on particulate desiccant;

(6) an oil vapor adsorber sorbing hydrocarbon vapor and hydrocarbon aerosols at least in part on particulate activated sorbent;

(7) an after-filter separating and removing particulate solids larger than bacterial dimensions; and

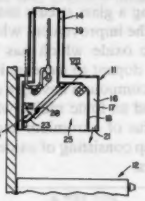
(8) a bacterial-retentive final filter separating and removing particulate solids of bacterial dimensions and any remaining hydrocarbon aerosols.

4,231,769

FILTERED VENTILATING SYSTEM

Willard K. Ahlrich, 2227 Pine Lake Dr. N.W., Stuart, Fla. 33494

Filed Feb. 21, 1978, Ser. No. 879,066
Int. Cl.[2] B01D *45/18*
U.S. Cl. 55—242 **16 Claims**



15. In a filtered ventilating system for a cooking unit, including:

a hood emplaceable above a cooking unit and opening downward theretoward for capturing fumes released during cooking;

an exhaust stack for removing cooking fumes entrapped by said hood, a barrier wall extending widthwise of said hood and dividing the interior of said hood into inlet and outlet zones respectively open to said cooking unit and said exhaust stack, said wall having a fume opening therethrough;

a filter panel disposable across said fume opening to filter out grease and the like from said cooking fumes prior to entry into said exhaust stack;

latch means for holding said filter panel in place in said fume opening;

the improvement comprising:

a pair of links, first pivots at one end of said links pivotally mounting said links on said barrier wall at opposite sides of said fume opening, the other ends of said links being pivotable from a retracted position extending along said barrier wall;

second pivots at said other end of said links pivotally mounting the central portions of sides of said filter panel on said other ends of said links for rotation of said filter panel through at least 180° with respect to said links, the maximum spacing from said first to said second pivots on each link exceeding one-half the height of the filter panel, said links being pivotable on said first pivots to an extended position angling at about a right angle from said barrier wall into said inlet zone for permitting said 180° rotation of said filter panel without interference between said filter panel and barrier wall;

said barrier wall including a bottom lip along the front bottom edge of the fume opening and extending upward to block the bottommost portion of the filter panel from moving forward into said intake zone;

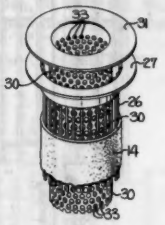
said links each incorporating lost motion means acting along the length thereof (1) for increasing the separation between the first and second pivots on each link to achieve said maximum spacing, and (2) for decreasing the separation between the first and second pivots on each link to permit the lower edge of the filter panel to clear said bottom lip as said filter panel enters or leaves said fume opening.

4,231,770

BAG-TYPE FILTER APPARATUS WITH INTERNAL AIR DIFFUSER

Allen S. Johnson, Jr., P.O. Drawer 1037, Salisbury, N.C. 28144

Filed Sep. 18, 1979, Ser. No. 76,605
Int. Cl.[3] B01D *46/04*
U.S. Cl. 55—302 **10 Claims**



4. In a filter apparatus of the type wherein a particulate-laden gas is directed through a tubular filter bag for filtering and retaining the particulate material on the exterior of the bag, and wherein the filter bag is cleaned by a periodic reverse purge of air into the bag, said filter bag having an outlet end for discharge of the filtered gas and being supported by a tubular supporting cage positioned within said filter bag, the combination therewith of hollow perforated means having a length less than said tubular supporting cage positioned within said tubular supporting cage and cooperating with said outlet end of the filter bag for diffusing and distributing throughout the filter bag air received within said hollow perforated means when a periodic reverse purge of air is directed into the outlet end of the filter bag so as to more effectively clean the filter bag while also reducing excessive flexing of the filter bag and abrasive wear thereof to thereby provide a substantial increase in the efficiency of the filter apparatus and a significant increase in the life of the filter bag.

4,231,771

DISPERSOID SEPARATION METHOD AND APPARATUS

Warren E. Winsche, Bellport, N.Y., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 28, 1978, Ser. No. 901,047
Int. Cl.[3] B01D *45/12*
U.S. Cl. 55—408 **1 Claim**

1. Apparatus for removing entrained particulate matter in the range of from five to ten microns from combustion gases produced in the burning of powdered coal, comprising:

means defining a cylindrical housing having an elongated vertical axis;

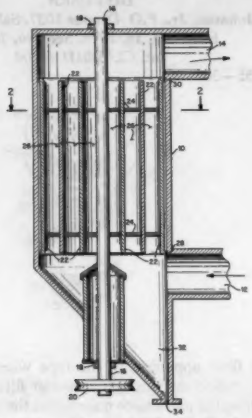
partition means, comprising a plurality of impervious wall members, for dividing the interior of said housing into a plurality of axially-extending coextensive, substantially unobstructed, annular and concentric through passages around in parallel forming annular collecting surfaces;

inlet means for directing tangentially into the lower end of said housing and said passages a flow of said combustion gases at a selected angular velocity sufficient to produce a centrifugal force on said entrained matter capable of driving said matter radially;

means for rotating said partition means around said axis at substantially said angular velocity so as to minimize the velocity difference between said gases and said surfaces and forming boundary layers of sufficient thickness to shield collecting material from the influence of the flowing gases to permit collection of substantially all of said entrained particulate matter;

hopper means located within said housing below said inlet means for removing particulate matter collect on said

surfaces when flow through said apparatus is terminated; and



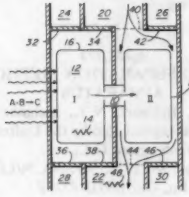
outlet means at the upper end of said housing for carrying away said gases after removal of said particulate matter.

4,231,772

SOLAR POWERED HEAT PUMP CONSTRUCTION

Charles A. Berg, Buckfield, Me., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Oct. 10, 1978, Ser. No. 950,180
Int. Cl.³ F25B *27/00, 29/00*
U.S. Cl. 62—2 **13 Claims**



1. Apparatus powered primarily by solar radiation for heating space in a building, said apparatus being operable to effect an intermittent heat pump cycle employing an adsorbent material and a working refrigerant comprising a condensible adsorbate, said apparatus comprising

first and second sealed chambers separated by a valve which, when open, provides a refrigerant vapor transfer path between the chambers,

said first chamber containing an adsorbent material, having a closed loop heat exchange system for exchanging heat with said adsorbent material, and being in thermal communication with a solar collector,

said second chamber being serviced by a second heat exchanger,

wherein said first chamber includes a heat and mass transfer promoting structure comprising a plurality of discreet wafers of adsorbent material for facilitating heat and mass transfer during adsorption/desorption, each said wafer having a surface exposed to a vapor flow path and a surface in contact with a sheet of material having high thermal conductance, said sheets being in thermal communication with said closed loop.

4,231,773

FIBROUS GLASS MANUFACTURE USING REFRACTORY BUSHING

Thomas D. Erickson, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Sep. 25, 1978, Ser. No. 945,734
Int. Cl.³ C03D *37/02*
U.S. Cl. 65—1 **6 Claims**

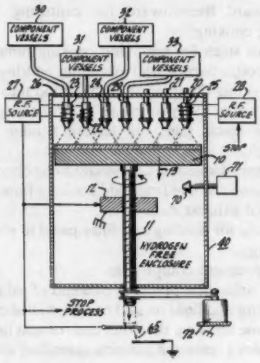
1. In a process for producing glass fibers comprising: electrically heating a bushing so as to maintain a pool of molten glass therein, and attenuating a glass stream issuing from said bushing into a glass fiber, the improvement wherein said bushing is fabricated of chromic oxide which has been doped with a sufficient amount of a dopant to increase its electrical conductivity said dopant is a compound having a cationic moiety with a valence of 1 or 2 and an ionic radius which is within about 15% of the ionic radius of chromium and an anionic moiety selected from the group consisting of oxides, halides, sulphates, carbonates and nitrates.

4,231,774

METHOD OF FABRICATING LARGE OPTICAL PREFORMS

Mokhtar S. Maklad, Roanoke, Va., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Apr. 10, 1978, Ser. No. 894,792
Int. Cl.³ C03B *37/025, 37/075*
U.S. Cl. 65—3 A **8 Claims**



1. A process for manufacturing an annular optical preform of a large diameter and of a predetermined height of the type capable of being drawn into an optical fiber, comprising the steps of:

rotating a high temperature resistant flat base member about its center,

positioning a first nozzle a predetermined distance above the center of said base member, generating an RF field at the location of said first nozzle for depositing a pyrolysed central core of glass by a vapor oxidation process on said rotating base member via said nozzle,

positioning a second nozzle adjacent said first and to the right and a third nozzle adjacent said first and to the left, both at said predetermined distance, generating an RF field at the location of said second and third nozzles for depositing by a vapor oxidation process a pyrolysed first annular glass ring about said core on said rotating base member,

positioning a fourth and a fifth nozzle with said fourth nozzle adjacent and to the right of said second nozzle and said fifth nozzle adjacent and to the left of said third nozzle each at said predetermined distance, generating an RF field at the location of said fourth and fifth nozzles for depositing by a vapor oxidation process a pyrolysed sec-

ond annular glass ring about said first ring and on said rotating base member,

advancing said rotating base member away from said nozzle position at a rate determined by the growth of said central core and annular rings to form a preform whose height increases as said base member advances, with the surface of said preform being parallel to the flat surface of said base member and,

ceasing the steps of rotating, advancing and generating said RF fields, when said preform attains said predetermined height.

4,231,775

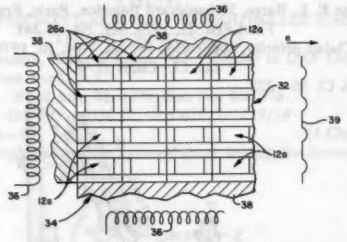
METHOD OF MAKING OMMATEAL LENSES AND PLATES

Walter P. Siegmund, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.

Filed Apr. 23, 1979, Ser. No. 32,323

Int. Cl.³ C03C *15/00, 25/06*

U.S. Cl. 65—30 E **10 Claims**



1. The method of making a unidirectionally graded refractive index columnar lens element comprising:

preparing an elongated lens preform of optical glass having a composition which includes a modifying oxide, said preform being of rectangular cross-sectional shape and having a pair of optically finished sides, one opposite the other;

positioning against each of said optically finished sides a piece of a first cladding glass which is preferentially soluble relative to the glass of said preform and substantially non-reactive with said modifying oxide;

positioning against each of remaining sides of said preform a piece of a second cladding glass which is also preferentially soluble relative to the glass of said preform but has an affinity to ions of said modifying oxide;

zonally heating and drawing the assembly of said preform and all cladding pieces sufficiently to bring at least a portion of said preform to the cross-sectional size desired of said lens element substantially without alteration of said rectangular shape of said preform;

substantially uniformly heating said portion of said preform and corresponding portions of said cladding pieces to a temperature and for a time sufficient to effect extraction of ions of the modifying oxide substantially only into said second cladding glasses;

cooling and annealing said portion of said preform; and

leaching all cladding glasses away from said portion of said preform whereby said portion constitutes said unidirectionally grades refractive index lens element.

4,231,776

METHOD FOR MANUFACTURING A PANEL OF ANISOTROPIC CERAMIC GLASS

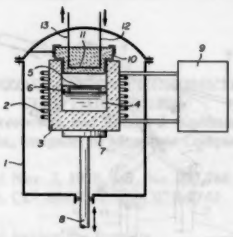
Felix Trojer, Lancy, and John Briggs, Onex, both of Switzerland, assignors to Battelle Memorial Institute, Geneva, Switzerland

Continuation of Ser. No. 707,756, Jul. 22, 1976, abandoned. This application Jun. 20, 1978, Ser. No. 917,196

Claims priority, application Switzerland, Jul. 22, 1975, 9557/75

Int. Cl.³ C03B *27/02*

U.S. Cl. 65—33 **2 Claims**



1. A method for manufacturing a panel of anisotropic ceramic glass comprising acicular crystals enclosed in a vitreous matrix, the acicular crystals being orientated perpendicularly to the panel faces and traversing the panel from one face to the other, comprising the steps of:

(a) preparing a homogeneous plate of a homogeneous mineral composition capable of forming a ceramic glass comprising a crystalline phase and a vitreous phase from a mixture of mineral oxides and mineral compounds capable of generating such oxides or a mixture of mineral compounds capable of generating such oxides, said plate being in vitreous state and having the shape and dimensions of the panel to be obtained,

(b) placing said plate of vitreous composition on the surface of and in contact with a molten metal bath consisting of a metal or alloy of a melting point lower than the melting point of said mineral composition, said molten metal bath being provided with heating means for heating said bath to a desired temperature whereby said placing brings the lower face of said plate in contact with said bath to the same temperature,

(c) providing cooling means for cooling said plate from above said plate and employing said cooling means to bring an upper face of said plate which is free from contact with said molten metal to a temperature below said desired temperature for said bath,

(d) and monitoring and controlling said respective heating and cooling means, so as firstly to bring the whole plate to a temperature at least equal to its working temperature and above the crystallization temperature range of the crystalline phase, while bringing the upper face of said plate to a temperature lower than that of a lower face in contact with the bath surface to establish a temperature gradient perpendicular to said faces, the whole of said temperature gradient remaining above said crystallization temperature range, and then to simultaneously decrease the temperature of the two faces of said plate to effectively maintain said temperature gradient essentially constant throughout the entire growth of the crystalline phase, said temperature decrease being continued until the whole of the temperature gradient is brought below said crystallization temperature range, to effect nucleation of the crystalline phase first in the upper face and acicular crystals to then grow downwards according to a planar growth front in the direction of the lower face until said lower face is reached, and the direction of maximum

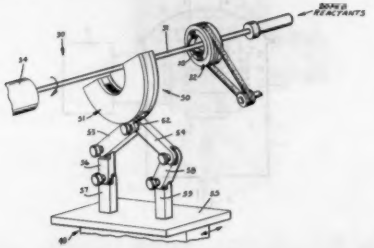
growth of the crystals thus formed being perpendicular to the faces of the panel throughout its whole thickness, whereby said panel of ceramic glass is formed.

4,231,777

METHODS OF AND APPARATUS FOR HEATING A GLASS TUBE

Brian Lynch, Norcross, and Fred P. Partus, Atlanta, both of Ga., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Mar. 27, 1979, Ser. No. 24,289
Int. Cl.[3] C03B *23/04, 37/025*
U.S. Cl. 65—109 21 Claims



1. A method of heating a glass tube, said method comprising the steps of:

heating an outer surface of the tube by directing a flow of combustible gases through a plurality of passageways in a housing toward a portion of the length of said tube;

cooling at least those portions of the housing and the walls that define end portions of the passageways which are adjacent the tube and from which the combustible gases exit without cooling said tube, said cooling being sufficient to inhibit degradation of the material forming said housing and said walls, and to thereby prevent contamination of the tube;

controlling the temperature profile along said portion of the length of said tube which includes providing a variable confinement of the heat to said portion of the length of the tube; and

causing relative motion between the tube and the housing along the tube to cause successive portions of the length of the tube to be heated while rotating said tube about an axis which extends along the length of the tube.

10. An apparatus for heating a glass tube, which includes:

means for supporting a tube for rotation about its longitudinal axis;

means for including a plurality of passageways for directing a flow of combustible gases toward said tube;

means for cooling at least those portions of the passageways which are adjacent the tube to inhibit contamination of the passageways and thereby prevent contamination of the tube;

means for providing a variable confinement of the heat to said portion of the length of the tube to control the temperature profile along said portion of the length of said tube, said means for providing a variable confinement including an arcuate surface spaced equidistantly from the tube for confining at least partially the tube, said means for controlling the temperature profile including means for mounting the arcuate surface for movement toward or away from the tube;

means for causing relative motion between the tube and the confining means along the tube to cause successive portions of the length of the tube to be heated; and

means for rotating the tube about an axis which extends along the length of the tube.

4,231,778

METHOD OF STRENGTHENING GLASS ARTICLES

Paul W. L. Graham, Toledo, and Thomas W. Moore, Jr., Perrysburg, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed May 18, 1979, Ser. No. 40,606
Int. Cl.[3] C03B *29/00, 32/00*
U.S. Cl. 65—117 12 Claims

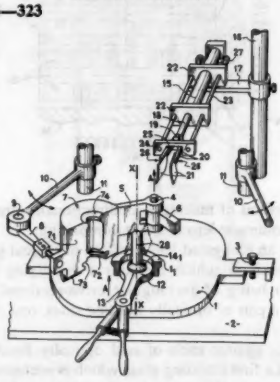
1. The method of strengthening newly-formed glass articles having surface defects in their exterior surfaces comprising the steps of allowing the said newly-formed glass articles to partially cool immediately following their formation, immediately rapidly heating the defect-containing newly-formed exterior surfaces of said articles to an elevated temperature ranging from about 1000° to 1250° F. for a period of time ranging from about 1 second to about 6 minutes, depending upon selection of the heat source, said time period being less than that which would cause visible softening or fusing of the said exterior surfaces, and then annealing said glass articles to remove stresses therefrom.

4,231,779

APPARATUS FOR MOLDING GLASS OBJECTS WITH TONGS AND SPADES

Rene E. L. Barre, 39 boulevard Bourdon, Paris, France

Filed Feb. 21, 1979, Ser. No. 13,361
Claims priority, application France, Nov. 10, 1978, 78 31899
Int. Cl.[3] C03B *11/00*
U.S. Cl. 65—323 3 Claims



1. In apparatus for manufacturing glass objects comprising a pair of chill-mould halves each including a mould recess, means for moving said mould halves toward and away from each other whereby the mould halves are movable together with their mould recesses in registration with each other to form a mould cavity with an upright axis at a predetermined mould position, tongs including jaws sized and shaped to fit into the mould cavity and to form the lower portion of the mould cavity, whereby a gob of molten glass is placed in the mould cavity and the mould halves are moved away from each other to leave a parison supported by the jaws of said tongs at the mould position, the improvement therein of two spades movable toward and away from said mould position on opposite sides of the upright axis, and means for moving said spades first in position on opposite sides of the parison supported by said jaws and then into contact with the parision, then out of contact with the parison and finally away from positions on opposite sides of the parison.

4,231,780
TREATMENT OF PHOSPHATE ROCK ON SOIL IN SITU WITH SULFURIC ACID

Dwight D. Collins, Bakersfield, Calif., assignor to Chemsoil Corporation, Bakersfield, Calif.

Filed Sep. 3, 1976, Ser. No. 720,499
Int. Cl.[2] C05B *1/00*
U.S. Cl. 71—40 14 Claims

1. The method of providing available phosphate and gypsum to soil comprising:

(a) applying bare granules of pulverized phosphate rock which has not been previously treated by sulfuric acid to the top of the soil exposed to the air without mixing the granules into the soil or otherwise covering the granules, whereby to form a layer of granules the top of which is exposed to the air and whose area covers the top of the soil to an appreciable extent; and

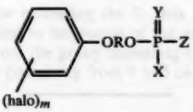
(b) applying to the top of said layer, sulfuric acid of such concentration as to be containable by equipment made of cold-rolled carbon steel without substantial corrosion, more viscous than water, and deliquescent, said concentration being above about 75% H_2SO_4, whereby that portion of the sulfuric acid which contacts the granules tends to remain adherently in contact with the granules and attract water for reaction with said granules, without substantial penetration of the acid into the soil beneath the granules.

4,231,781
HALOPHENOXY-ALKOXY PHOSPHONATES AND THIOPHOSPHONATES

Fred S. Eiseman, Basking Ridge, N.J., assignor to GAF Corporation, New York, N.Y.

Filed Aug. 31, 1978, Ser. No. 938,376
Int. Cl.[3] A01N *57/10*; C07F *9/12, 9/18*
U.S. Cl. 71—87 11 Claims

1. A halophenoxy-alkoxy phosphonate having the formula:



wherein

R is alkylene having from 1 to 4 carbon atoms;

Y is oxygen or sulfur

X is OH, halo,

—ORSROH or OH—NH(R‴) (ROH);

Z is—OH, halo,

or, when X is OH—NH(R‴) (ROH), then Z can also be OH—NH(R‴) (ROH);

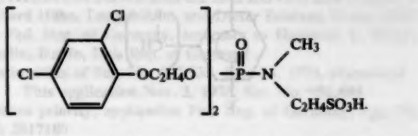
R′ is hydrogen or alkyl having from 1 to 4 carbon atoms;

R″ is an alkyl sulfonic acid or a halide or alkali metal salt thereof, where R″ contains not more than 4 carbon atoms;

R‴ is hydrogen or —ROH; and

m is an integer having a value of from 1 to 5 and wherein at least one of X and Z is other than —OH.

2. The compound of claim 1 having the formula:

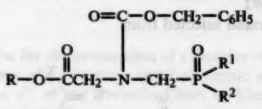


4,231,782
N-CARBOBENZOXY-N-PHOSPHONOMETHYLGLYCINE THIOESTERS

John E. Franz, Crestwood, and Robert J. Kaufman, University City, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Nov. 3, 1978, Ser. No. 957,766
Int. Cl.[3] A01N *57/12*; C07F *9/40*
U.S. Cl. 71—87 30 Claims

1. A compound having the formula



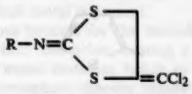
wherein R is a member of the class consisting of alkyl of from 1 to 10 carbon atoms, chloroalkyl of from 1 to 4 carbon atoms and containing from 1 to 3 chlorine atoms, alkoxyalkoxy of from 3 to 7 carbon atoms and alkoxyalkoxyalkoxy of from 5 to 9 carbon atoms and R^1 and R^2 are each selected from the class consisting of lower alkoxy, cyanoalkoxy containing from 2 to 4 carbon atoms, lower alkenylthio, alkylthio containing from 1 to 6 carbon atoms, phenylalkylthio wherein the alkyl group contains up to 4 carbon atoms, phenylthio and substituted phenylthio.

4,231,783
SUBSTITUTED 2-IMINO-1,3-DITHIO AND 1,3-OXATHIO HETEROCYCLIC COMPOUNDS AS HERBICIDAL ANTIDOTES

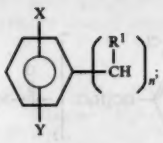
Frederic G. Bollinger, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Nov. 15, 1978, Ser. No. 960,987
Int. Cl.[3] A01N *43/02*
U.S. Cl. 71—90 26 Claims

1. A method of reducing injury to crop plants selected from the group consisting of rice, sorghum and wheat due to the application thereto of thiocarbamate herbicides which comprises applying to the plant locus a safening effective amount of a compound having the formula



or an agriculturally acceptable acid addition salt thereof, wherein R is



R_1 is hydrogen or lower alkyl; X and Y independently equal hydrogen, lower alkyl, lower alkoxy or halogen; n is 0, 1, 2 or 3; provided that when n is 1 R_1 cannot equal ethyl.

4,231,784

HERBICIDAL SULFONAMIDES

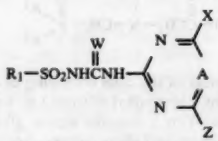
George Levitt, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 820,882, Aug. 1, 1977. This application May 10, 1979, Ser. No. 37,948

Int. Cl.³ A01N *43/02 , 43/48 ;* **C07D** *239/28 , 239/34 , 403/12*

U.S. Cl. 71—92 **12 Claims**

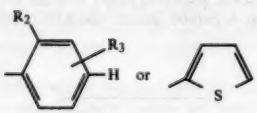
1. A compound selected from



(I)

where

R_1 is



R_2 and R_3 are independently hydrogen, fluorine, chlorine, bromine, methyl, methoxy, nitro or trifluoromethyl;

W is oxygen or sulfur;

X is $-NHCH_3$ or $-N(CH_3)_2$;

Z is methyl or methoxy; and

A is

or N

and their agriculturally suitable salts provided that when R_2 is nitro or trifluoromethyl, R_3 can not be nitro or trifluoromethyl and when A is N, then R_1 is

11. A method for the control of undesirable vegetation comprising applying to the locus of such undesirable vegetation a herbicidally effective amount of a compound of claim 1.

4,231,785

HERBICIDE ANTIDOTES

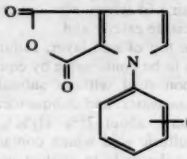
Larry W. Peterson, Oakdale, Calif., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 937,621, Aug. 28, 1978, abandoned. This application May 21, 1979, Ser. No. 41,266

Int. Cl.³ A01N *25/32, 43/70, 43/36*

U.S. Cl. 71—93 **5 Claims**

1. A method for increasing the safety of the herbicide, cyanazine, with respect to a grain sorghum plant, which comprises making available to the growing sorghum plant, just before the plant is contacted with the herbicide, an effective amount of one of six antidote compounds of the formula:



wherein in each of said compounds, n and R are as follows:

n	R
0	—
1	3-(—Cl)
1	2-(—F)
1	3-(—CF_3)
1	2-(—Cl)
2	2-(—Cl),5-(—Cl)

wherein the number indicates the position of the substituent, R, on the indicated phenyl ring.

4,231,786

COMPOSITIONS AND METHODS FOR REDUCING HERBICIDAL INJURY

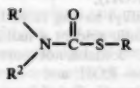
Albert J. Czajkowski, Maryland Heights, and David E. Schafer, St. Louis, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 26, 1974, Ser. No. 536,527

Int. Cl.³ A01N *37/20*

U.S. Cl. 71—100 **5 Claims**

1. A method for reducing injury to wheat, sorghum and corn by thiolcarbamate herbicides selected from the group consisting of S-2-dichloroallyl N,N-diisopropylthiocarbamate and S-2,3,3-trichloroallyl N,N-diisopropylthiolcarbamate which comprises applying to the soil, crop or crop seed an effective safening amount of a compound of the formula



wherein R is lower alkyl, R′ is hydrogen and R^2 is phenyl.

4,231,787

HERBICIDAL COMPOUND, HERBICIDAL COMPOSITION CONTAINING THE SAME, AND METHOD OF USE THEREOF

Ryuzo Nishiyama, Takatsuki; Ryohei Takahashi, Tokyo; Kanichi Fujikawa, Kyoto; Rikuo Nasu, and Nobuyuki Sakashita, both of Kusatsu, all of Japan, assignors to Ishihara Sangyo Kaisha Ltd., Osaka, Japan

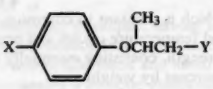
Division of Ser. No. 734,913, Oct. 22, 1976, Pat. No. 4,105,435. This application Jun. 21, 1978, Ser. No. 917,758

Claims priority, application Japan, Oct. 29, 1975, 50-129313; Apr. 23, 1976, 51-46800; Jul. 30, 1976, 51-90315

Int. Cl.[2] A01N *9/24*

U.S. Cl. 71—107 1 Claim

1. A method for controlling noxious gramineous weeds in the presence of cultivated broad leaf crops which comprises applying a herbicidally effective amount of a herbicidal composition which consists essentially of a herbicidally effective amount of at least one compound having the formula (I):



(I)

wherein X is 4-trifluoromethylphenoxy group; and Y is a hydroxy group or a phenylcarbonyloxy group as an active ingredient and an agriculturally acceptable adjuvant.

4,231,788

RIPENING OF GRAPES

Sidney R. Siemer, Fresno, Calif.; Richard S. Gordon, St. Louis, Mo., and Louis G. Nickell, Chicago, Ill., assignors to W. R. Grace & Co., New York, N.Y.

Filed Apr. 27, 1979, Ser. No. 33,884

Int. Cl.[3] A01N *37/02, 35/02*

U.S. Cl. 71—113 9 Claims

1. A method for increasing the % Brix in grapes prior to harvest by applying to the leaves of the grape vines a compound selected from the group consisting of vanillin and carboxylic acid salts containing from 3 to 5 carbon atoms.

4,231,789

METHOD FOR PROTECTING CROPS FROM SUFFERING DAMAGES

Mitsuyoshi Okii, 2611-6, Oyama-machi, Machida-shi, Tokyo; Tatsuya Onitake, 1-3, Kiso-machi, Machida-shi, Tokyo; Masanobu Kawai, 1-12-2, Asahi-machi, Machida-shi, Tokyo; Tetsuo Takematsu, 612, Mine-machi, Utsunomiya-shi, Tochigi-ken Tokyo, and Makato Konnai, 3645, Tsuruta-machi, Utsunomiya-shi, Tochigi-ken, all of Japan

Division of Ser. No. 807,743, Jun. 17, 1977, abandoned. This application Oct. 5, 1978, Ser. No. 948,781

Claims priority, application Japan, Jun. 17, 1976, 51/70405; Jun. 17, 1976, 51/70406; Aug. 5, 1976, 51/92752; Jan. 24, 1977, 52/5785

Int. Cl.[2] A01N *33/04*

U.S. Cl. 71—121 7 Claims

1. A method for protecting a crop selected from the group consisting of a gramineous crop, radish, mulberry and tobacco from suffering damage selected from the group consisting of cold-weather damage, frost damage, fading of green color, damage from photochemical oxidants and wilting of leaves which comprises applying to a locus to be protected, in an amount sufficient to protect said crop, an alkylene diamine represented by the general formula:

$$H_2N-(CH_2)_n-NH_2$$

wherein n is an integer of 4–12.

4,231,790

PROCESS FOR THE PREPARATION OF TANTALUM AND NIOBIUM POWDERS OF IMPROVED EFFICIENCY

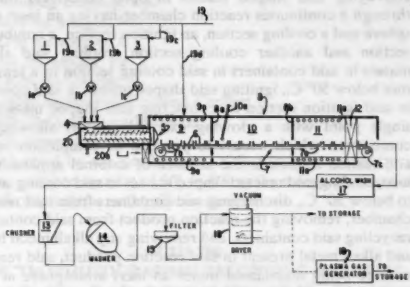
Reinhard Hähn, Langelsheim, and Dieter Behrens, Goslar, both of Fed. Rep. of Germany, assignors to Hermann C. Starck Berlin, Berlin, Fed. Rep. of Germany

Continuation of Ser. No. 677,038, Apr. 14, 1976, abandoned. This application Nov. 2, 1978, Ser. No. 956,898

Claims priority, application Fed. Rep. of Germany, Apr. 18, 1975, 2517180

Int. Cl.[3] B22F *9/00;* C22B *34/24*

U.S. Cl. 75—0.5 BB 21 Claims



1. A process for the preparation of a powder of high electrical capacitance of a transition metal of atomic number above 23 of column d3 of the Periodic Chart of Elements, which comprises the steps of:

heating a shallow bed of a powdered alkali metal transition metal halide selected from the group consisting of alkali metal tantalum halide and alkali metal niobium halide in a vacuum and/or under an inert atmosphere thereby removing any water and hydrogen halide present at a temperature of about 325° C. up to the sintering point of said powder to such an extent that said heating decrepitates said alkali metal transition metal halide;

mixing said powder maintained under a dry inert gas with powdered anhydrous alkali metal halide maintained under a dry inert gas and alkali metal maintained under a dry inert gas in 1:0.75–2.0:4.75–5.5 molar ratio at a temperature above the liquefaction point of said metal and below the ignition point of said mixture thereby forming a paste;

forming said paste into shaped masses;

cooling said shaped masses to a temperature below 50° C. and then igniting said shaped masses by contacting said shaped masses at a single point with a glowing external ignitor thereby initiating a reduction reaction and forming elementary tantalum or niobium;

allowing said reaction to go to substantial completion in the absence of external application of heat;

the dimensions of said shaped masses and their temperature at ignition of below 50° C. being predetermined so that the maximum temperature reached by said shaped masses during said reaction is less than about 800° C. and is between about three and five times the ignition temperature of the paste;

cooling said reacted shaped masses;

and pulverizing the reaction product and removing any alkali metal halide and alkali metal present; said steps being performed in an inert atmosphere or under vacuum while any alkali metal is present.

17. A continuous process for the manufacture of tantalum metal powder which comprises heating a shallow bed of a powdered alkali metal tantalum halide in a vacuum and/or under an inert atmosphere thereby removing any water and hydrogen halide present at a temperature of about 325° C. up to the sintering point of said powder to such an extent that said heating decrepitates said alkali metal tantalum halide, mixing

said powder maintained under a dry inert gas with dry powdered anhydrous alkali metal halide maintained under a dry inert gas and an alkali metal maintained under a dry inert gas in 1:0.75–2.0:4.75–5.5 molar ratio at a temperature above the melting point of said metal and below the ignition point of said mixture thereby forming an extrudable paste, extruding said paste into shaped masses in open containers, the dimension of said shaped masses of paste in said open containers and their temperature at ignition of below 50° C. being predetermined so that the maximum temperature reached by said shaped masses during said reaction is less than about 800° C. and is between about three and five times the ignition temperature of the paste, conveying said shaped masses in open containers therefor through a continuous reaction chamber having an inert atmosphere and a cooling section, an ignition section, a combustion section and another cooling section, cooling said shaped masses in said containers in said cooling section to a temperature below 50° C., igniting said shaped masses in said container in said ignition section by contacting said shaped masses at a single point with a glowing external ignitor, allowing the combustion which occurs to proceed to completion in said combustion section in the absence of external application of heat, cooling said reacted shaped masses in said cooling section to below 50° C., discharging said containers from said reaction chamber, removing the reaction product from said containers, recycling said containers, and removing any alkali metal halide and alkali metal present in said reaction product, said reaction mixture being maintained under an inert atmosphere at least until said reaction is substantially complete.

4,231,791

ROASTING OF SULPHIDE MATERIALS

James A. Charles, Stapleford, England, assignor to Metallurgical Processes Ltd. and I.S.C. Smelting Ltd., both of, The Bahamas

Filed Jul. 5, 1979, Ser. No. 54,872

Claims priority, application United Kingdom, Jul. 4, 1978, 28729/78

Int. Cl.³ C22B *1/10, 13/00, 19/00*

U.S. Cl. 75—9 **6 Claims**

1. A process for roasting zinc/lead sulphide materials, comprising forming substantially spherical pellets composed predominantly of lead sulphide, coating said pellets with predominantly zinc sulphide material, and then roasting the coated pellets in a roasting apparatus to effect oxidation of sulphide, predominantly to oxide.

4,231,792

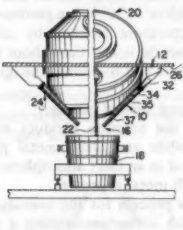
CHUTE WITH HAZARDOUS FLAME AND FUME CONTROL

Frederic J. Adelsperger, Highland, Ind., assignor to Republic Steel Corporation, Cleveland, Ohio

Filed Mar. 23, 1979, Ser. No. 23,336

Int. Cl.³ C21C *7/00;* **C21B** *7/16*

U.S. Cl. 75—53 **8 Claims**



1. In apparatus for making additions to molten metal, said apparatus including a tubular chute having an upper entry opening for receiving additions and a lower discharge opening adapted to be located adjacent an open vessel into which the molten metal is poured, said chute having a tendency to act as a chimney for hot gases, the improvement comprising means to inject gas into the chute between the upper entry opening and the lower discharge opening in directions toward the discharge opening and across the chute, at a flow rate and pressure sufficient to prevent an upward flow of hot gases through the chute when molten metal is poured into a vessel adjacent the lower discharge opening, and to create a lower than ambient pressure at the upper entry opening.

4,231,793

NICKEL-BASE ALLOY

Gerhard Kruske, Oberursel; Otto Knotek, Aachen, both of Fed. Rep. of Germany, and Erich Lugscheider, Vaals, Netherlands, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jul. 3, 1979, Ser. No. 54,519

Claims priority, application Fed. Rep. of Germany, Jul. 6, 1978, 2829702

Int. Cl.² C22C *19/05*

U.S. Cl. 75—122 **4 Claims**

1. A nickel-base alloy which is resistant to corrosion, abrasion, erosion, cavitation and temperature cycles and possesses a high high-temperature strength, consisting essentially of the following composition in percent by weight:

Carbon: 0.5 to 5
Tungsten: 2 to 15
Chromium: 25 to 55
Boron: 0.5 to 3.5
Phosphorus: 0.5 to 4.5
Silicon: 1 to 5
Iron: 1 to 5
Nickel: balance

and meets the following boundary conditions:

(a) percent by weight C = percent by weight C_1 = percent by weight C_2 + 0.2;

(b) percent by weight W = 36 × percent by weight C_1;

(c) percent by weight Cr ≧ 17 + 9 × percent by weight C_2 − 4 × percent by weight C.

4,231,794

LEAD BASED ALLOY FOR THE BONDING OF ALUMINUM PARTS TO PARTS COMPRISING AN ALLOY OF A HEAVY METAL

Jean-Pierre Moranne, Franconville, France, assignor to Societe Anonyme des Usines Chausson, Asnieres, France

Filed Apr. 13, 1979, Ser. No. 29,862

Claims priority, application France, Apr. 20, 1978, 78 11759

Int. Cl.³ B23K *35/26*

U.S. Cl. 75—166 C **3 Claims**

1. Soldering alloy having a lead base for the soldering or soft brazing of parts of which at least one part is made of aluminum or aluminum alloy and another part is made of an alloy of heavy metal selected from copper, brass, stainless steel and the like, comprising:

70 to 90% lead by weight
10 to 30% cadmium by weight
0.5 to 2% tin by weight and
between 0.2 and 1% antimony by weight.

4,231,795

HIGH WELDABILITY NICKEL-BASE SUPERALLOY

Robert C. Gibson, Ringwood, N.J., and Michael K. Korenko, Richland, Wash., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 22, 1978, Ser. No. 917,833

Int. Cl.² C22C *19/05*

U.S. Cl. 75—171 **5 Claims**

1. A nickel base alloy consisting essentially of, by weight percent, 57–63 Ni, 7–18 Cr, 10–20 Fe, 4–6 Mo, 1–2 Nb, 0.2–0.8 Sl, 0.01–0.05 Zr, 1.0–2.5 Ti, 1.0–2.5 Al, 0.02–0.06 C and

0.002–0.015 B, said alloy being characterized by a combination of long-term structural stability, strength and excellent weldability.

4,231,796

INTERNAL ZONE GROWTH METHOD FOR PRODUCING METAL OXIDE METAL EUTECTIC COMPOSITES

Grady W. Clark, Oak Ridge; John D. Holder, Knoxville, and Arvid E. Pasto, Oak Ridge, all of Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 28, 1978, Ser. No. 964,406
Int. Cl.³ B22F *3/00*
U.S. Cl. 75—206 8 Claims

1. A method for preparing a cermet composite comprising the steps of

(a) preparing a compact having about 85 to 95 percent theoretical density from a mixture of metal and metal oxide powders, said metal and metal oxide comprising a system containing a eutectic composition; and

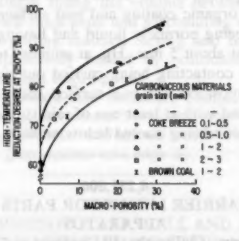
(b) inductively heating said compact in a radiofrequency field to cause the formation of an internal molten zone contained within an external solid skin of compact material, said metal oxide particles in said powder mixture being effectively sized relative to said metal particles to permit direct inductive heating of said compact by said radiofrequency from room temperature to form said internal molten zone.

4,231,797

FIRED IRON-ORE PELLETS HAVING MACRO PORES

Isao Fujita, Kobe; Mamoru Onoda, Miki; Fumikazu Kawaguchi, Kobe; Yoshimichi Takenake, Kobe, and Tadao Tsutaya, Kobe, all of Japan, assignors to Kobe Steel, Limited, Kobe, Japan

Continuation of Ser. No. 774,067, Mar. 3, 1977, abandoned. This application Jan. 8, 1979, Ser. No. 1,837
Claims priority, application Japan, Mar. 3, 1976, 51-23647
Int. Cl.³ B22F *3/10*
U.S. Cl. 75—256 1 Claim



1. Fired iron ore pellets containing macro pores ranging from 0.1 to 3 mm in diameter dispersed throughout each of said pellets at a ratio of from 5 to 25% relative to all of the pores contained in each pellet and which have been prepared by firing a green pellet comprising up to 4% of a carbonaceous material having a grain size of from 0.1 to 3 mm, from 3 to 9% dolomite, iron ore particles wherein 60–95% of the said iron particles are up to 44μ in size and 15 to 25% of said iron ore particles are up to 10μ in size, and limestone in an amount so as to adjust the CaO/SiO_2 ratio to about 1.2.

4,231,798

ALLOY CARRIER FOR CHARGING CUPOLA FURNACES

Hans Schramm, and Klaus Schramm, both of Essen, Fed. Rep. of Germany, assignors to Frank & Schulte GmbH, Essen, Fed. Rep. of Germany

Filed May 17, 1979, Ser. No. 39,938
Int. Cl.³ C22C *37/00*
U.S. Cl. 75—256 1 Claim

1. An alloy carrier for charging cupola furnaces, the carrier having the form of bodies molded with cement, the alloys being manganese in the form of ferromanganese and silicon, in the following composition:

8–40% by weight, Mn
9–22% by weight, C
2–9% by weight, Fe
18–45% by weight, Si
15–30% by weight, Portland Cement
4–8% H_2O, chemically bound
2–7% impurities

characterized by the employment of ferromanganese carbure having a carbon content of 6% to 8% as the manganese carrier and silicon carbide as the silicon carrier.

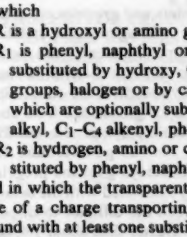
4,231,799

ELECTROPHOTOGRAPHIC RECORDING MATERIAL

Jürgen Rochlitz, Breckenheim, and Günter Schön, Wiesbaden, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 354,199, Apr. 25, 1973, abandoned. This application May 15, 1975, Ser. No. 577,953
Claims priority, application Fed. Rep. of Germany, Aug. 30, 1972, 2242627
Int. Cl.² G03G *5/04*
U.S. Cl. 430—59 11 Claims

1. An electrophotographic recording material comprising an electroconductive support material with a photoconductive double layer of organic materials composed of a tightly packed, homogeneous, uniform, opaque, charge carrier producing dyestuff layer prepared by vacuum evaporation of the dyestuff and a transparent top layer of insulating materials with at least one charge transporting compound, in which the organic dyestuff layer is composed of the general formula



in which

R is a hydroxyl or amino group,

R_1 is phenyl, naphthyl or quinolyl which are optionally substituted by hydroxy, C_1–C_4 alkyl, C_1–C_4 alkoxy, nitro groups, halogen or by carbamoyl or sulfonamido groups which are optionally substituted at the nitrogen by C_1–C_4 alkyl, C_1–C_4 alkenyl, phenyl or cyclohexyl groups,

R_2 is hydrogen, amino or carbamoyl, which may be N-substituted by phenyl, naphthyl or benzimidazolonyl

and in which the transparent top layer is composed of a mixture of a charge transporting monomeric heterocyclic compound with at least one substituted amino group and having an extended π-electron system, which is selected from the group of oxazoles, oxdiazoles, triazoles, imidazoles and pyrazoles, and a binder in a ratio by weight of about 1:1,

which recording material is useful in an electrophotographic copying process with negative charging of the top layer.

4,231,800

DRY HEAT SETTING REFRACTORY AND METHODS OF USING SAME

John P. Holt, Ladue, and Theodore P. Cash, Bonne Terre, both of Mo., assignors to Valley Mineral Products Corporation, St. Louis, Mo.

Filed May 14, 1979, Ser. No. 38,918
Int. Cl.[3] C04B 35/04
U.S. Cl. 106—58 8 Claims

1. A dry heat setting refractory composition which forms an adhesive bond in situ upon application of sufficient heat to melt said alkali silicate, comprising about 94% to about 98% refractory material and about 6% to about 2% of hydrated alkali silicate, said refractory material being sized so that it contains about 28% to about 38% coarse fraction, about 38% to about 48% intermediate fraction and about 15% to about 25% fine fraction, said fine fraction containing sufficient magnesite to react with the alkali silicate present to form fosterite and a solid solution of alkali oxide in excess MgO to provide a bond preventing the refractory from breaking up at temperatures above the melting point of said alkali silicate, said composition being substantially free of water and materials which generate substantial amounts of liquid at or below steelmaking temperatures.

4,231,801

CEMENT AND CONCRETE MIXTURE

Harvey R. Dunton, Anaheim, Calif., assignor to Associated Concrete Products, Inc., Santa Ana, Calif.

Filed Sep. 14, 1978, Ser. No. 942,310
Int. Cl.[3] C04B 31/02
U.S. Cl. 106—97 5 Claims

1. A composition for concrete comprising:
(a) water,
(b) fine and coarse aggregate; and
(c) a cement mixture which in turn comprises from about 20% up to about 25% fines of alumino-silicate petroleum cracking catalysts with the balance being a cementing agent.

4,231,802

METHOD OF MIXING DIFFICULTY DISPERSIBLE MATERIAL, E.G., FAT OR WAX, IN A GUM-MICROCRYSTALLINE CELLULOSE MATRIX, AND POWDER PRODUCT

Emanuel J. McGinley, Morrisville, Pa., and Joseph M. Zuban, Holiday, Fla., assignors to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 691,267, Jun. 1, 1976, abandoned. This application Jul. 10, 1978, Ser. No. 923,501
Int. Cl.[3] A21D 2/18; C08L 1/02
U.S. Cl. 106—197 C 5 Claims

1. A method of preparing powders and granules capable of forming in cold water with only mild agitation, a stabilized micro-dispersion of a difficult to disperse material; said method comprising mixing the difficult to disperse material in liquid form with a matrix comprising by weight from about 70 to about 99 parts of disintegrated beta-1,4 glucan and from about 1 to about 30 parts of a water soluble polymer selected from sodium carboxymethyl cellulose, xanthan gum, sodium alginate, carrageenan, tragacanth gum, karaya gum and pregelatinized waxy maize starch intimately associated with the beta-1,4 glucan, the ratio by weight between the difficult to disperse material and the matrix being not greater than about 1:4, adding sufficient water to swell the matrix and form a paste, said water amounting to from about 10% to about 85% of the weight of the paste, mixing the paste to distribute said difficult to disperse material therethroughout, and continuing to mix while heating the paste to drive off the added water.

4,231,803

STARCH ADHESIVE COMPOSITION CONTAINING AN OXIDIZED WAXY STARCH ESTER

Edward M. Bovier, St. Louis County, and James A. Carter, St. Louis, both of Mo., assignors to Anheuser-Busch Incorporated, St. Louis, Mo.

Filed May 22, 1978, Ser. No. 908,222
Int. Cl.[3] C08L 3/06
U.S. Cl. 106—213 15 Claims

1. A composition suitable for use as a remoistening adhesive for gummed tape comprising an esterified oxidized waxy starch ester, a plasticizer, and water, said waxy starch ester having an acyl substitution of about 1.5% to about 2% and about 0.3% to about 0.5% carboxyl groups, said composition when applied to tape, dried, and remoistened having tack properties similar to those of an adhesive made from animal glue.

4,231,804

VAPOR STRIPPING METHOD

Robert C. Petterson, 7800 Cohn St., New Orleans, La. 70118, and Roger C. Loubier, 1000 Milton St., Gretna, La. 70053

Filed Jan. 17, 1978, Ser. No. 870,103
Int. Cl.[2] B08B 5/00
U.S. Cl. 134—11 22 Claims

1. A method for stripping a protective coating from the surface of a coated object, comprising circulating a stream of a stripping composition in a gaseous state at about ambient temperature and pressure into contact with said surface for a time sufficient to destroy the adhesion between said protective coating and said surface and substantially in the absence on said surface of liquid condensate of said stripping composition, said stripping composition normally being a liquid and having a partial pressure of at least about 5 mm. of Hg. at ambient temperature and pressure.

4,231,805

VAPOR STRIPPING PROCESS

Robert C. Petterson, 7800 Cohn St., New Orleans, La. 70018, and Roger C. Loubier, 1000 Milton St., Gretna, La. 70053

Continuation-in-part of Ser. No. 870,103, Jan. 17, 1978. This application Jan. 4, 1979, Ser. No. 1,053
Int. Cl.[2] B08B 5/00
U.S. Cl. 134—11 33 Claims

20. A method for stripping an organic coating from the surface of a coated object comprising circulating a stream of a stripping composition in a gaseous state into contact with said surface for a period of time sufficient to destroy the adhesion between said organic coating and said surface, said stripping composition being normally liquid and having a partial pressure of at least about 5 mm. Hg. at ambient temperature and pressure, said contacting being carried out with neither said stripping composition nor said surface above about ambient temperature and with at least one of said surface or said stripping composition being cooled below ambient temperature.

4,231,806

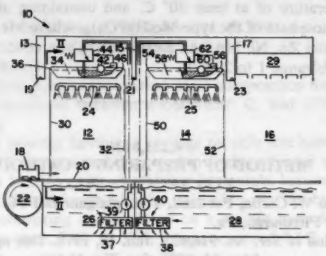
FLUID BARRIER MEANS FOR PARTS WASHER APPARATUS

William P. Henry, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 25, 1978, Ser. No. 936,960
Int. Cl.[3] B08B 7/04
U.S. Cl. 134—18 3 Claims

3. A method of isolating a wash zone (12) in a parts washer (10) having openings defining entrance and exit passages (19, 21) of said wash zone (12), comprising:
passing a generally continuous laminar liquid curtain (30 or 32) across at least one of said openings, including supplying a source of liquid to a reservoir (34) positioned at the

top of said wash zone (12) and maintaining a level of liquid in said reservoir (34) sufficient to provide a continuous



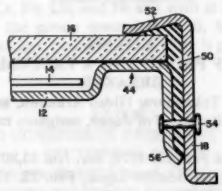
flow of the liquid over at least one edge (36 or 46) of said reservoir (34).

4,231,807

ENCLOSURE FOR A SOLAR CELL ARRAY

Michael C. Keeling, Tempe, and Dwight E. Doss, Phoenix, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Division of Ser. No. 865,038, Dec. 27, 1977, Pat. No. 4,170,507.
This application May 11, 1979, Ser. No. 38,152
Int. Cl.³ H01L *31/04*
U.S. Cl. 136—251 **3 Claims**



1. An enclosed solar cell module which comprises:

a cover glass;

a flexible metallic back plate, configured so that a solar cell array can be positioned between said cover glass and said back plate, said back plate having an edge lip against which said cover glass can sit;

an array of solar cells positioned between said cover glass and said back plate;

a potting material filling the volume between said cover glass and said back plate and surrounding said solar cell array, said potting material flexing said back plate and being compressively loaded by positioning said cover glass against said edge lip; and

an edge seal around said enclosure comprising a pliable gasket material and a metal bezel, said edge seal confining said potting material within said enclosure and holding said cover glass against said edge lip.

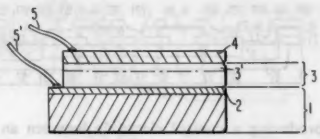
4,231,808

THIN FILM PHOTOVOLTAIC CELL AND A METHOD OF MANUFACTURING THE SAME

Masatoshi Tabei; Kazuhiro Kawaziri, and Yosuke Nakajima, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Sep. 5, 1979, Ser. No. 72,817
Claims priority, application Japan, Sep. 5, 1978, 53-108958
Int. Cl.³ H01L *31/04*
U.S. Cl. 136—260 **17 Claims**

1. A method of manufacturing a photovoltaic cell which comprises providing a thin coating of n-type CdTe of up to about 2 microns thick on a conductive surface of a substrate, heat-treating said CdTe thin coating at a temperature of from about 80° to 210° C. for a period of from 20 to 180 minutes to form a modified surface region of said CdTe coating, and providing a transparent output electrode on the surface of said heat-treated thin coating opposite the substrate.



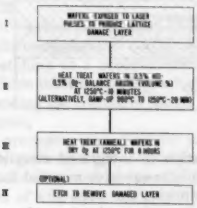
6. A thin film photovoltaic cell comprising a conductive support, an overlying n-type CdTe layer having a thickness of up to about 2 microns which has been heat-treated at about 80° to 210° C. for about 20 to 180 minutes and a transparent electrode on the surface of said heat treated CdTe layer opposite said support.

4,231,809

METHOD OF REMOVING IMPURITY METALS FROM SEMICONDUCTOR DEVICES

Paul F. Schmidt, Allentown, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 25, 1979, Ser. No. 42,401
Int. Cl.³ H01L *21/322, 21/324*
U.S. Cl. 148—1.5 **8 Claims**


I
MATERIAL EXPOSED TO LASER PULSES TO PRODUCE LATTICE DAMAGE LAYER
II
HEAT TREAT WAFERS IN 0.5% HCl, 0.5% O2, BALANCE ARGON (VOLUME %) AT 1250°C-30 MINUTES, ALTERNATIVELY, RAMP-UP 1000°C TO 1250°C-20 MIN
III
HEAT TREAT (ANNEAL) WAFERS IN DRY O2 AT 1250°C FOR 8 HOURS
(OPTIONAL)
IV
ETCH TO REMOVE DAMAGED LAYER

6. In a process for gettering transition metal impurities from a body of silicon semiconductor material which comprises heating the body in an ambient which includes hydrogen chloride and dry oxygen

the improvement comprising the ambient comprises by volume, hydrogen chloride about 0.5 percent, oxygen from about 0.5 to 1.0 percent, and the balance argon.

4,231,810

PROCESS FOR PRODUCING BI-POLAR CHARGE COUPLED DEVICES BY ION-IMPLANTATION

Ottomar Jäntsch, Ottobrunn, and Jenö Tihanyi, Munich, both of, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Aug. 13, 1979, Ser. No. 65,960
Claims priority, application Fed. Rep. of Germany, Aug. 28, 1978, 2837485
Int. Cl.³ H01L *29/78, 21/265*
U.S. Cl. 148—1.5 **8 Claims**

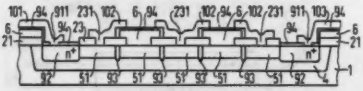
1. A process for producing a charge coupled device for sensors and memories comprising:

(a) providing a semiconductor substrate of a first conductivity type;

(b) producing regions of a second conductivity type in said semiconductor substrate via ion implantation so as to form a shift channel;

(c) producing zones of said first conductivity type in said regions via ion implantation;

said regions and zones being arranged in series, with each region being separated from other regions and each zone being separated from other zones;



(d) producing a control electrode between an interspace between said zones and above portions of said zones which are adjoin said interspace; and

(e) producing a relatively highly doped region of said second conductivity type at each end of said shift channel via ion implantation.

4,231,811

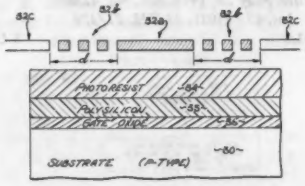
VARIABLE THICKNESS SELF-ALIGNED PHOTORESIST PROCESS

Sasson Somekh, Redwood City, and C. Norman Ahlquist, Menlo Park, both of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed Sep. 13, 1979, Ser. No. 75,095

Int. Cl.³ H01L *21/26*

U.S. Cl. 148—1.5 **11 Claims**



1. In the fabrication of integrated circuits, a process for forming a layer of photo-sensitive material having two different thicknesses comprising the steps of:

providing a masking member having at least one area which substantially blocks light and a second area which includes a plurality of spaced-apart features of predetermined dimensions and spacing;

projecting light with a projection means through said masking member onto a layer of said photo-sensitive material, said projection means for resolving images only with dimensions greater than those of said features, such that said photo-sensitive material receiving light passing through said second area of said masking member is uniformly illuminated at an intermediate intensity; and

developing said photo-sensitive material;

whereby two different thicknesses of said layer are formed with a single masking step.

4,231,812

SURFACE TREATMENT OF METAL STRIP

Philippe Paulus, Liege, and Jules Hancart, Jupille, both of Belgium, assignors to Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie, Brussels, Belgium

Filed Mar. 13, 1979, Ser. No. 20,196

Claims priority, application Belgium, Mar. 14, 1978, 864899

Int. Cl.² C23F *7/10*; C21D *1/60*

U.S. Cl. 148—6.15 R **17 Claims**

1. A method of treating the surface of a steel strip and coating it with a phosphate layer, during thermal treatment which comprises quenching after recrystallization, the method comprising the following steps:

(a) heating the strip to a temperature higher than the recrystallization temperature and holding at this temperature; and

(b) quenching the strip in a phosphating bath having a temperature of at least 80° C. and containing at least one phosphate of the type $Me(H_2PO_4)_n$, where Me is selected from Zn, Ni, Mn, and alkali metals, at a concentration in the range 1 to 20 g/l.

4,231,813

METHOD OF PREPARING A CATHODE ELECTROCATALYST

William W. Carlin, Portland, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 916,637, Jun. 19, 1978. This application May 24, 1979, Ser. No. 42,166

The portion of the term of this patent subsequent to Jan. 1, 1997, has been disclaimed.

Int. Cl.² C25B *1/46, 11/04*

U.S. Cl. 148—6.3 **4 Claims**

1. A method of preparing an electrode comprising the steps of:

(a) depositing tungsten, cobalt, and phosphorous onto a metal substrate; and

(b) heating the substrate in the presence of an oxygen containing oxidizing atmosphere sufficiently to form a porous surface rich in oxycompounds of cobalt of the plus three oxidation state.

4,231,814

METHOD OF PRODUCING A VACUUM CIRCUIT BREAKER

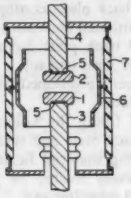
Ryuji Watanabe, Tokaimura; Hideo Arakawa, and Keiichi Kuniya, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 22, 1979, Ser. No. 13,807

Claims priority, application Japan, Feb. 22, 1978, 53/18502; Feb. 24, 1978, 53/19659

Int. Cl.² C21D *1/44*

U.S. Cl. 148—11.5 C **10 Claims**



1. A method of producing a vacuum circuit breaker having breaker contacts made of a cast alloy, said cast alloy containing copper or a copper alloy as its main component and, as the sub-component, a metal having a lower melting point and a higher vapour pressure than said main component and having a solubility limit to said main component at room temperature, said sub-component being contained in excess of said solubility limit at room temperature,

characterized by comprising the steps of heating said cast alloy in a vacuum atmosphere at a temperature of 800° C. or higher but not so high as to cause a melting of said cast alloy to spheroidize said sub-component in said main component and to remove sub-component exuded to the surface of said cast alloy from said surface and then mounting said cast alloy as said breaker contacts into said vacuum circuit breaker.

4,231,815

COPPER ALLOY BRAZING PASTE

John L. Snyder, Cleveland, Ohio, assignor to SMC Corporation, New York, N.Y.

Filed Aug. 9, 1979, Ser. No. 65,374
Int. Cl.[3] B23K *35/34*
U.S. Cl. 148—24 2 Claims

1. A copper-manganese brazing paste composition for brazing at temperatures between about 1650° C. and 1850° C., comprising:

the alloy powder having an average particle size between 5 and 177 microns and dispersed in fugitive binder to provide a brazing paste containing by weight between 2% and 50% said fugitive binder, said alloy powder being an alloy consisting essentially of on a weight basis 60% to 75% copper, 24% to 37% manganese, and 0.5% to 3% silicon.

4,231,816

AMORPHOUS METALLIC AND NITROGEN CONTAINING ALLOY FILMS

Jerome J. Cuomo, Lincolndale; Amitava Gangulee, Croton-on-Hudson, and John Kobliska, Mount Kisco, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 30, 1977, Ser. No. 866,115
Int. Cl.[3] C04B *35/00*
U.S. Cl. 148—31.55 12 Claims

1. An amorphous metallic alloy film composed of nitrogen with at least one transition metal selected from the group consisting of Cr, Fe, Co, and Ni and with at least one element selected from the group consisting of B, Si, Al, C, and P, wherein the nitrogen content of said alloy is greater than about 1 atomic percent.

4,231,817

EXTRUDED CORROSION RESISTANT STRUCTURAL ALUMINUM ALLOY

Yo Takeuchi, Urawa; Koichi Ohbori, Ohmiya; Masabumi Hatsushika, Kitamoto, and Shinichi Komori, Urawa, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Ohtemachi, Japan

Filed Nov. 9, 1978, Ser. No. 959,094
Int. Cl.[3] C22C *21/10*
U.S. Cl. 148—32.5 4 Claims

1. An extruded corrosion-resistant aluminum alloy structural element having a strength of from 25 to 40 kg/mm^2 prepared by extrusion and heating treatment of an aluminum alloy which consists essentially of, in weight percentage

magnesium from 0.45 to 0.98%,
silicon from 0.3 to 0.8%,
zinc from 0.5 to 2.5%,

and

the balance aluminum and incidental impurities.

4,231,818

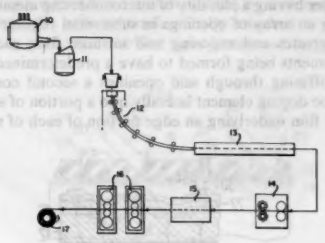
METHODS OF PRODUCING SILICON STEEL STRIP

Robert H. Henke, Pittsburgh, Pa., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 680,527, Apr. 26, 1976, abandoned, which is a division of Ser. No. 493,531, Aug. 1, 1974, Pat. No. 3,969,162, which is a division of Ser. No. 239,538, Mar. 30, 1972, Pat. No. 3,843,422. This application May 22, 1979, Ser. No. 41,341
The portion of the term of this patent subsequent to Oct. 22, 1991, has been disclaimed.
Int. Cl.[3] H01F *1/04*
U.S. Cl. 148—111 5 Claims

1. The method of producing silicon steel strip for magnetic purposes from slabs comprising the steps of:

(a) heating the slabs to a temperature above 2200° F., to stabilize MnS, and immediately rolling said slabs into strip in a planetary mill of the Zendzimer type to a thickness range of about 0.060 to 0.150 inch while maintaining the



temperature in the temperature range 2100° F. to 2200° F., during said rolling, and

(b) quenching the strip to precipitate MnS.

4,231,819

DIELECTRIC ISOLATION METHOD USING SHALLOW OXIDE AND POLYCRYSTALLINE SILICON UTILIZING A PRELIMINARY ETCHING STEP

Jack I. Raffel, Lexington, and Stephen E. Bernacki, Worcester, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Division of Ser. No. 773,637, Feb. 28, 1977, Pat. No. 4,184,172, which is a continuation-in-part of Ser. No. 747,743, Dec. 6, 1976, abandoned. This application Jul. 27, 1979, Ser. No. 61,374
Int. Cl.[2] H01L *21/20, 21/302, 21/76*
U.S. Cl. 148—175 3 Claims

1. A method for achieving isolation of the silicon islands of integrated circuits comprising:

isotropically etching to a predetermined depth those portions of a silicon substrate surface which correspond to the area surrounding the bottom of silicon islands to be subsequently grown,

oxidizing the preceding etched silicon surface,

simultaneously growing a polycrystalline layer of silicon on said oxidized surface and an epitaxial layer on the remaining portions of said silicon substrate to form said silicon islands,

masking the surface of said silicon islands leaving the portions of said islands contiguous to said polysilicon surface unmasked and also any regions of said island surface for oxide isolation between impurity junctions,

oxidizing the exposed silicons, the depth of such silicon etching and the thickness of said oxide being such that the top of said oxide is substantially co-planar with the top surface of the masked silicon islands and the bottom of the oxide extends below the junction depth of junctions to be subsequently formed in said epitaxial silicon islands,

removing said mask on the surface of the silicon islands to provide a surface into which impurities may be provided to form junction devices in said islands.

4,231,820

METHOD OF MAKING A SILICON DIODE ARRAY TARGET

William N. Henry, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 21, 1979, Ser. No. 13,120
Int. Cl.[3] H01L *21/225*
U.S. Cl. 148—187 13 Claims

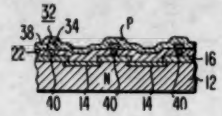
1. In a method of making a silicon diode array target of the type wherein an insulating layer is deposited on a semiconductor substrate of a first conductivity type and an array of apertures is formed through said layer exposing said substrate, wherein the improvement comprises the steps of:

(a) depositing a film of substantially intrinsic polycrystalline

silicon over said insulating layer and the exposed substrate in said openings;

(b) forming photolithographically on said film a masking layer having a plurality of interconnecting members defining an array of openings in substantial register with said apertures and exposing said intrinsic film, each of said elements being formed to have a predetermined width;

(c) diffusing through said openings a second conductivity type doping element laterally into a portion of said intrinsic film underlying an edge portion of each of said masking members, so that the width of the undoped intrinsic film underlying each of said masking members is less than the predetermined width;



(d) simultaneously driving said doping element through the intrinsic film deposited in said opening into said substrate to form an array of PN junctions therein;

(e) removing said masking layer; and

(f) selectively etching away the undoped intrinsic film to form an array of doped polycrystalline silicon pads separated by the width of the removed undoped intrinsic film.

4,231,821

EMULSION BLASTING AGENT SENSITIZED WITH PERLITE

Walter B. Sudweeks, Orem, and Larry D. Lawrence, Salt Lake City, both of Utah, assignors to IRECO Chemicals, Salt Lake City, Utah

Filed May 21, 1979, Ser. No. 41,154
Int. Cl.³ C06B *45/02*
U.S. Cl. 149—21 **11 Claims**

1. A cap-sensitive water-in-oil emulsion blasting composition comprising a water-immiscible liquid organic fuel as a continuous phase, an emulsified aqueous inorganic oxidizer salt solution as a discontinuous phase, an emulsifier, and perlite in an amount of from about 1.0% to about 8% by weight based on the total composition having an average particle size ranging from about 100 microns to about 150 microns as a sensitizing agent and a density reducing agent in amount sufficient to reduce the density of the composition to within the range of from about 0.9 to about 1.4 g/cc and to render the composition cap-sensitive.

4,231,822

NON-POLLUTING PROCESS FOR DESENSITIZING EXPLOSIVES

Milton Roth, Rockaway, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 18, 1978, Ser. No. 970,404
Int. Cl.³ C06B *21/00*
U.S. Cl. 149—109.6 **5 Claims**

1. A method for desensitizing an explosive material containing at most the elements of carbon, hydrogen, oxygen and nitrogen, said method consisting essentially of:

preparing a slurry of said explosive material in an aqueous solution of a reductant containing no elements besides those contained in said explosive material, said reductant being selected from the group consisting of acetaldehyde, citric acid, formaldehyde, formic acid, lactic acid, maleic acid, malic acid, malonic acid, oxalic acid, tartaric acid and glucose, wherein said explosive material is present essentially in solid, particulate form, and

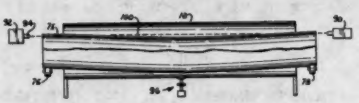
reacting said explosive material and said reductant in said slurry for a period of time sufficient to achieve desensitization of said explosive material.

4,231,823

METHOD AND APPARATUS FOR CENTERING TWO CONCENTRIC CYLINDERS

Milburn L. Hart, La Marque, Tex., and John F. Bridge, Worthington, Ohio, assignors to H. C. Price Co., Bartlesville, Okla.

Division of Ser. No. 857,088, Dec. 5, 1977, Pat. No. 4,141,130.
This application Dec. 13, 1978, Ser. No. 969,289
Int. Cl.² G01B *1/00*
U.S. Cl. 156—64 **10 Claims**



1. A method for monitoring the position of a section of pipe within a filling cavity formed by the pipe and an outer jacket during filling, said method comprising the steps of:

establishing a linear reference line along the inner surface of said section of pipe; and

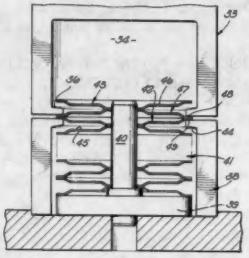
detecting the deviation of said section of pipe from said reference line caused by movement of said section of pipe during filling.

4,231,824

METHOD OF MAKING A BELLOWS

William J. Cooper, Los Angeles, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Nov. 30, 1978, Ser. No. 965,295
Int. Cl.³ B32B *31/20*
U.S. Cl. 156—73.1 **1 Claim**



1. The method of making a bellows, said method comprising the steps of: forming a plurality of centrally apertured plastic discs, each being symmetrical about an axis and having an approximately planar central annular portion and inner and outer annular flanges connected to said central annular portion around a corresponding aperture and around an outer edge thereof, respectively, said flanges lying generally in parallel planes normal to said axis and on opposite sides of the plane of said central annular portion; placing the inner flanges of two reversed discs in contact with each other with one inner flange on a first fixture; placing a first ultrasonic welding horn with a hollow cylindrical end portion on the other inner flange; exciting said first horn in a manner to cause said two inner flanges to weld together; repeating said placing and exciting steps to weld a plurality of pairs of said discs together at corresponding contacting inner flanges thereof and to form a plurality of respective subassemblies; having respective axes of symmetry; sliding a first subassembly onto a second fixture with the outer

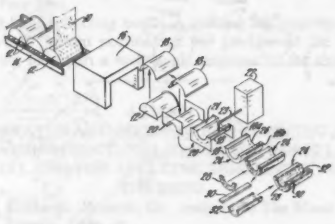
flanges of the two discs of the first subassembly straddling a semicircular projection of said second fixture; sliding a second subassembly onto a second ultrasonic welding horn with the outer flanges of the two discs of the second subassembly straddling a semicircular projection of said second horn; and aligning said second fixture and said second horn until one outer flange of said first subassembly contacts and is coaxial with that of said second subassembly; and exciting said second horn to weld the contacting outer flanges of said first and second subassemblies together; and repeating said sliding and exciting steps while replacing said first subassembly on said second fixture with said second subassembly and ultrasonically welding a third subassembly to said second, a fourth to said third, a fifth to said fourth, and so on.

4,231,825

METHOD OF MAKING JACKETED FOAM PIPE INSULATION

Neil A. Carter, Reynoldsburg, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Apr. 23, 1979, Ser. No. 32,182
Int. Cl.[2] B32B *5/20*
U.S. Cl. 156—78 **2 Claims**



1. A method of making jacketed foam pipe insulation (24) comprising applying hardenable liquid resin impregnated fibrous glass mat (10) to a semicylindrical mold (12), curing the resin in the mat (10) while it is on the mold (12) to form a semicylindrical glass fiber reinforced resin jacket (18), removing the jacket (18) from the mold (12), assembling the jacket (18) in cooperative concentric relationship with a second semicylindrical mold (20) of a smaller radius than that of the first mold (12) to provide a semicylindrical space (21) therebetween, inserting a foamable hardenable liquid resin in the semicylindrical space (21), allowing the liquid resin in the space (21) to expand into foam (26) and harden while adhering to the jacket (18) to form a semicylindrical piece of jacketed foam pipe insulation (24), removing the second semicylindrical mold (20) from the jacketed foam pipe insulation (24), adhering a compressible semicircular pad (28) of fibrous glass wool with a suitable adhesive to one end face of the jacketed foam pipe insulation (24), and adhering a compressible strip (30) of fibrous glass wool with a suitable adhesive to a flat longitudinal face of the jacketed foam pipe insulation (24).

4,231,826

PROCESS FOR FORMING V-BELTS AND BELT SLEEVES

Richard E. Wrast, Nixa, Mo.; William J. Gardiner, Lakewood, and Francis A. Shedd, Denver, both of Colo., assignors to The Gates Rubber Company, Denver, Colo.

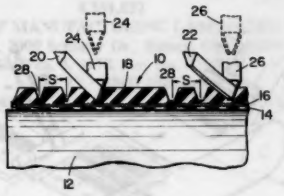
Filed Dec. 22, 1978, Ser. No. 972,291
Int. Cl.[3] B29H *7/22*; F16G *5/06*
U.S. Cl. 156—138 **9 Claims**

1. A process for making V-belts comprising the steps of:

fabricating an inverted belt sleeve from generally uncured elastomeric material with a tensile member interpositioned between an inner first layer and an outer second layer;

skiving circumferential strips of uncured elastomeric material from the second layer at axial spacings of the sleeve and forming a plurality of circumferential grooves in the sleeve;

molding and curing the skived belt sleeve while partially forming inverted V-belts with molded, overspaced V-side portions, the belts circumferentially attached to one another by portions of the first layer juxtaposed the grooves;



removing portions of the molded V-sides at the circumferential grooves to define raw V-sidewall portions having predetermined spacing; and

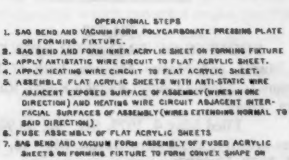
circumferentially severing the cured belt sleeve juxtaposed at least some of the circumferential grooves thereby forming a plurality of finished V-belts having raw edge V-sidewall portions.

4,231,827

PRESS POLISHING AND LAMINATING PLASTIC TRANSPARENCIES USING POLYCARBONATE PRESSING PLATES

James F. Wilson, Worthington, and James C. Craig, Butler, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 29, 1979, Ser. No. 25,151
Int. Cl.[3] B32B *27/00*; B29C *1/00*
U.S. Cl. 156—214 **13 Claims**


OPERATIONAL STEPS
1. SAG BEND AND VACUUM FORM POLYCARBONATE PRESSING PLATE ON FORMING FIXTURE.
2. SAG BEND AND FORM INNER ACRYLIC SHEET ON FORMING FIXTURE
3. APPLY ANTISTATIC WIRE CIRCUIT TO FLAT ACRYLIC SHEET.
4. APPLY HEATING WIRE CIRCUIT TO FLAT ACRYLIC SHEET.
5. ASSEMBLE FLAT ACRYLIC SHEETS WITH ANTI-STATIC WIRE ADJACENT EXPOSED SURFACE OF ASSEMBLY (WIRES IN ONE DIRECTION) AND HEATING WIRE CIRCUIT ADJACENT INTERFACIAL SURFACES OF ASSEMBLY (WIRES EXTENDING NORMAL TO SAID DIRECTION).
6. FUSE ASSEMBLY OF FLAT ACRYLIC SHEETS
7. SAG BEND AND VACUUM FORM ASSEMBLY OF FUSED ACRYLIC SHEETS ON FORMING FIXTURE TO FORM CONVEX SHAPE ON SURFACE ADJACENT ANTI-STATIC WIRE CIRCUIT.
8. ASSEMBLE FORMED POLYCARBONATE PRESSING PLATE WITH ITS CONCAVE SURFACE FACING CONVEX SURFACE OF FUSED, FORMED ACRYLIC SHEETS AND ADDITIONAL LAYERS OF MATERIAL TO BE LAMINATED AGAINST CONCAVE SURFACE OF FUSED, FORMED ACRYLIC SHEETS, AND PROTECT EXPOSED ACRYLIC SHEET
9. LAMINATE ASSEMBLY FORMED IN STEP 8.
10. SEPARATE POLYCARBONATE PRESSING PLATE FROM RESULTING LAMINATED ASSEMBLY.

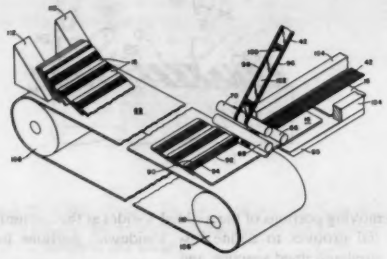
1. A method of press polishing a surface of a curved solid sheet of cast or stretched acrylic resin comprising holding a rigid, smoothly surfaced sheet of polycarbonate of complemental curvature against said surface with no parting material therebetween to form an assembly, and subjecting said assembly to sufficient elevated pressure and temperature for sufficient time for said surface of said rigid acrylic resin sheet to develop the smoothness of said polycarbonate sheet, said temperature being a maximum of 250° F. (121° C.) for cast acrylic resin and 217° F. (103° C.) for stretched acrylic resin so that it is below the deformation temperature of said polycarbonate sheet and sufficiently high to press polish the surface of said acrylic resin sheet without unduly softening said acrylic resin sheet.

4,231,828

METHOD FOR APPLYING MAGNETIC STRIPS

Leonard A. Mintz, 27 Kettering Rd., Norwood, Mass. 02062

Division of Ser. No. 822,822, Aug. 8, 1977, Pat. No. 4,149,925.
This application Jan. 10, 1979, Ser. No. 2,544
Int. Cl.[2] B44C *3/02*
U.S. Cl. 156—230 **4 Claims**



1. The method of sealing a strip of magnetic material to the surface of a card-like member comprising:

(a) superimposing an elongated tape coated with a magnetic material on the surface of said card-like member;

(b) feeding said card and superimposed tape between a heated roller having a pressing edge and a reaction roller;

(c) driving said heated roller at which the surface speed of said pressing edge is slightly slower than the velocity at which said card-like member is fed to said roller whereby said card-like member accelerates the speed of said heated roller to bring the surface speed of its periphery into substantial synchronism with the surface speed of said reaction roller;

(d) heating said heated roller to a predetermined temperature;

(e) forcing said heated roller against said card-like member with a constant predetermined pressure at which said magnetic material seals to said surface; and

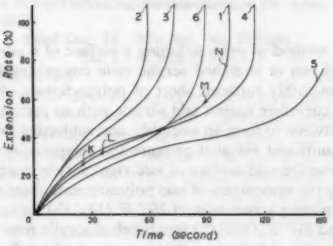
(f) shearing the portion of said magnetic material sealed to said surface from the rest of the magnetic material on said tape by pulling tape away from said card-like member.

4,231,829

PROCESS OF TRANSFER PRINTING

Toshio Marui, and Masuo Masuda, both of Ibaraki, Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed May 4, 1979, Ser. No. 35,986
Claims priority, application Japan, May 16, 1978, 53-58567; May 25, 1978, 53-91076
Int. Cl.[2] B41M *3/12*; B44C *1/16*
U.S. Cl. 156—230 **7 Claims**



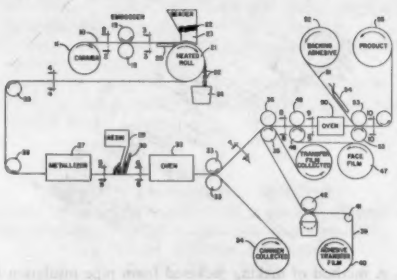
1. In a process of transferring a pattern printed on a thin film of a polyvinyl alcohol resin to a surface of an object by pressing the object to the thin film floated on the surface of water with the printed surface faced up and submerging the object into the water, the improvement which comprises incorporating boric acid or its salts selected from the group consisting of borax, anhydrous borax and borates other than sodium borate into said thin film of polyvinyl alcohol resin or into said water; said resin having an average degree of polymerization of 300 to 3,000 and an average degree of hydrolysis of 65% to 97% by mole; said boric acid or its salt being incorporated in said film in an amount of 0.02% to 10% by weight based on the polyvinyl alcohol resin or in the water in a concentration of 0.002% to 0.5% by weight.

4,231,830

PROCESS FOR PREPARING REFLECTING SHEETING HAVING WIDE ANGLE RESPONSE

John R. Ryan, Jackson, Miss., and Paul Shalita, Roslyn Heights, N.Y., assignors to Ferro Corporation, Cleveland, Ohio

Division of Ser. No. 811,945, Jun. 30, 1977, Pat. No. 4,123,140.
This application Oct. 17, 1978, Ser. No. 952,145
Int. Cl.[2] B32B *31/20, 15/20*; G02B *5/128*
U.S. Cl. 156—232 **12 Claims**



1. A process for preparing a reflective sheeting having a wide angle response comprising:

(a) embossing a deformable carrier sheet free of light-reflecting beads to form a network of relatively depressed cavities having straight wall and bottom portions spaced apart by ridges, said carrier sheet comprising a supporting sheet having a coherent film of thermoplastic material that is sufficiently adhesive to retain and position such beads thereon,

(b) then adhering to said wall and bottom portions of the cavities and said ridges of said adhesive thermoplastic film of the carrier sheet light-reflecting beads while leaving portions of said beads exposed,

(c) filling said cavities and covering said ridges and exposed portions of said beads with a solidified layer of a resinous organic matrix having a greater adherence to said beads than said carrier sheet has to form ridges and cavities in the matrix corresponding, respectively, to said cavities and ridges of the carrier sheet,

(d) separating the carrier sheet from said matrix and transferring the beads from said sheet to said matrix to coat similarly the cavities and ridges thereof,

(e) applying an adhesive to said ridges of the matrix and securing a light-transmitting film to said ridges to form an encapsulated reflective sheeting having open areas between said cavities and film,

(f) said light-reflecting beads in coating the corresponding wall and bottom portions of the cavities formed in the matrix serving to impart a wide angle response to the sheeting.

5. A process for preparing an encapsulated reflective sheeting having wide angle response comprising:

(a) embossing a deformable carrier sheet free of light-reflecting beads but having a film of a thermoplastic material to

form a network of relatively depressed cavities having straight wall and bottom portions and spaced apart by straight ridges, said wall and bottom portions and ridges being lined with said thermoplastic film,

(b) heating said deformed carrier sheet to render said thermoplastic material adhesive,

(c) partially embedding light-reflecting beads in said heated, adhesive thermoplastic film lining the side and bottom portions of said cavities and said ridges,

(d) coating the exposed portions of said beads with a reflective metal,

(e) filling said cavities and covering said ridges and beads with a solidified layer of a resinous organic matrix having a greater adherence to said beads than the thermoplastic film of said carrier sheet has, and forming cavities having straight wall and bottom portions and ridges in said matrix corresponding to said ridges and cavities, respectively, of said carrier sheet,

(f) separating said carrier sheet and its thermoplastic film from said beads and matrix,

(g) applying an uncured, thermosetting adhesive to said ridges of the matrix,

(h) securing a light-transmitting face film to said matrix at said ridges by said adhesive to form an encapsulated reflecting sheeting having open areas between said cavities and face film,

(i) said light-reflecting beads in coating the corresponding side and bottom portions of the cavities of the matrix serving to impart a wide angle response to the sheeting.

4,231,831

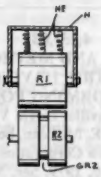
APPARATUS AND METHOD FOR FORMING AN ELONGATED STRUCTURAL ELEMENT FROM PLASTIC MATERIAL AND FOR APPLYING A DECORATIVE FILM THERETO

James L. Gebhardt, Roswell, Ga., assignor to The Mead Corporation, Dayton, Ohio

Continuation of Ser. No. 861,547, Dec. 19, 1977, abandoned. This application Apr. 30, 1979, Ser. No. 34,365

Int. Cl.[3] B44C *1/14, 1/24, 3/02*

U.S. Cl. 156—233 **4 Claims**



1. A method of transferring a decorative film forming a part of a coating on one surface of each of two tapes to two angularly related surfaces respectively of an elongated element, said method comprising the steps of passing said element and one of said tapes between a first pair of heated pressure rolls one of said rolls having a groove on the periphery thereof and with the coating on said one tape pressed into face contacting relation with one of said surfaces of said element by an ungrooved peripheral portion of said one roll and with the other of said surfaces disposed in said groove, adjusting the temperature of said first pair of rolls at a level between 550° F. and 650° F. and the velocity of movement of said element at a level between fourteen and nineteen feet per minute, the higher the temperature, the faster the velocity may be, twisting said element about its linear axis downstream from said first pair of pressure rolls, passing said element and the other of said tapes between a second pair of heated pressure rolls one of said rolls having a groove on the periphery thereof and with the coating on said other tape pressed into face contacting relation with the other of said surfaces of said element by an ungrooved peripheral portion of said one of said second pair of pressure rolls and with said one tape and said one surface disposed in said groove of said one of said second pair of pressure rolls, and adjusting the temperature of said second pair of pressure rolls to a level correlated with the velocity of movement of said element, said pairs of pressure rolls being similarly oriented.

4,231,832

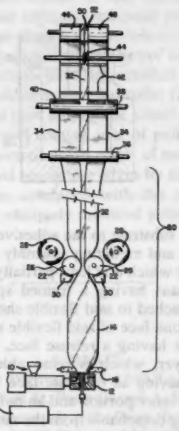
PROCESS OF MANUFACTURING LAMINATED WEB

Roy J. Welkert, 2000 Schlater Dr., Sidney, Ohio 45365

Filed Feb. 3, 1978, Ser. No. 874,794

Int. Cl.[2] B29D *23/04*

U.S. Cl. 156—244.14 **13 Claims**



1. A process of manufacturing a laminated web of bags comprising the steps of:

extruding in molten form a cylindrical tube of thermoplastic material,

inflating said tube as it is extruded to provide an inflated length of said tube extending from said extruder,

applying to said inflated length of said tube in sheet form a laminate of material which covers a major portion of the surface of said tube but has a total width less than the full circumference of said tube,

flattening the combined tube and laminate without fusing opposed walls of said tube to each other and with a resulting uncovered portion of said tube extending longitudinally thereof, and

sealing said laminate to said flattened tube and said opposed walls of said tube to each other along lines extending transversely of said flattened tube a distance less than the width of said flattened tube to provide a web of interconnected, laminated bags.

4,231,833

LAMINATED FRAME ASSEMBLY AND PROCESS

Aaron L. Lieberman, 426 Ashbourne Rd., Elkins Park, Pa. 19117

Filed Oct. 20, 1978, Ser. No. 953,024

Int. Cl.[3] B32B *31/00*; A47G *1/08, 1/12*

U.S. Cl. 156—249 **38 Claims**

1. A process for framing and mounting an indicia-bearing sheet comprising the steps of

(a) removing a portion of a release sheet from a framing assembly, said framing assembly comprising

a flexible sheet which is at least partially transparent to light,

a framing means attached to said flexible sheet,

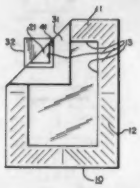
an adhesive layer adhered to one face of said flexible sheet, and

said release sheet having a first face, in contact with said adhesive layer, which is removable from the adhesive layer and an opposite face,

wherein the framing means has a framed space substantially of the same dimensions as the release sheet portion removed from the assembly;

(b) laminating to the assembly, in the space created by the removal of the release sheet portion in step (a), an indicia-bearing sheet which indicia is visible through said flexible sheet through the face opposite said adhesive layer;

(c) removing the remaining release sheet from the assembly; and



(d) adhering a substrate to the adhesive exposed by step (c).

25. A framing and mounting assembly comprising

a flexible sheet which is at least partially transparent to light,

a framing means having a framed space, which framing means is attached to said flexible sheet, an adhesive layer adhered to one face of said flexible sheet, and

a release sheet having a release face, in contact with said adhesive layer, which is removable from the adhesive layer, and having an opposite face, wherein said release sheet has an inner portion and an outer portion, said inner portion being detachable from the outer portion and defining a space having substantially the same dimensions as the frame space.

4,231,834

PROCESS TO MANUFACTURE TUBULAR ARTICLES RESEMBLING WOOD, CANE, BAMBOO, REED, WICKER, RATTAN, RUSH, AND THE LIKE

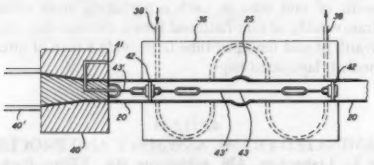
Humberto Trejo Gonzalez, Av. Presidentes No. 52, Mexico City 13, Mexico

Continuation-in-part of Ser. No. 893,850, Apr. 6, 1978, abandoned. This application Feb. 9, 1979, Ser. No. 11,006

Claims priority, application Mexico, May 30, 1977, 169238; May 30, 1977, 169239; May 30, 1977, 169244

Int. Cl.³ B29C *17/07, 27/14*

U.S. Cl. 156—294 **22 Claims**



1. A method for producing artificial, tied tubular structures, the tying and the tubular portions of which have the appearance of natural materials, comprising the steps of:

extruding a thermoplastic tubular material having base coloring,

separately extruding tying strips of basically colored thermoplastic material with striations formation on the surfaces thereof, longitudinally orienting the molecules of the material as it is being extruded whereby a molecular memory is imposed thereon,

applying coloring to said strips of thermoplastic material by treating it with a solvent that at least partially disssolves said material, said solvent material having powdered polyvinyl chloride and a pigmenting material dispersed in it, whereby said thermoplastic material is made to resemble natural materials,

heating preselected portions of the extruded tube after it leaves the extruding die and applying pressure to the heated portion to deform it so that the tube has deformed portions alternating with non-deformed portions,

forming annular incisions in the hot deformed portions and peripheral striations as well as longitudinal incisions perpendicular to the said annular incisions, and then cooling the tube,

applying to the surface of the tube a solvent for the material of the tube,

pigmenting the extruded tube with pigment dispersed in the said solvent that has thermoplastic material dissolved in it so that the pigment will simulate veins on the surface of the tubular material,

allowing the pigmented alternatively deformed tubular material to air-dry,

cutting the tubular material processed by the foregoing steps into desired lengths,

heating it at selected points to bend tubular lengths as may be required, and letting it cool; attaching connecting means to the ends of said cooled tubular portions, and

tying together the cut tubular material by means of said strips of colored thermoplastic material after connecting them in such manner as to produce structural portions of furniture, ornaments, and structures in general made of natural looking materials such as wood, rattan, cane, reed, rush, bamboo, wicker and the like, the said strips becoming tightened when their oriented molecules recover their original position.

20. A two piece travelling mold wherein the two pieces are essentially symmetrical and hinged by the lower edge of their inner surfaces, having each of them a lengthwise cavity along their mid-portion, and at their center of the cavity length there is an irregular deeper recessed cavity, said lengthwise cavity forming a molding duct when the mold hinged pieces rotate about their hinge so that their inner surfaces come together to close the mold.

4,231,835

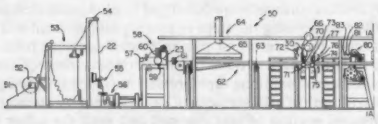
APPARATUS FOR AND METHOD OF MAKING CARPETING STRIP HAVING INTEGRAL SEAM-FORMING PORTION

Rufus N. Ensley, Waynesville; Doyle V. Haren, Clyde; Arthur D. Logan, and Michael E. McLean, both of Waynesville, all of N.C., assignors to Dayco Corporation, Dayton, Ohio

Filed Apr. 10, 1979, Ser. No. 28,787

Int. Cl.³ B65H *25/00;* **B32B** *31/00*

U.S. Cl. 156—361 **16 Claims**



2. In an apparatus for continuously making a carpeting strip having integral joining means; said apparatus comprising means for feeding a wear layer having a bottom surface and opposed side edges; means for continuously moving and guiding said wear layer in a rectilinear path; photoelectric means for sensing opposite side edges of said wear layer to enable adjustment of a part of said moving means and thereby provide adjustment of the position of said wear layer; a pair of devices for fixing a pair of release tapes against said bottom surface with each of said devices fixing its release tape adjacent an associated side edge portion of said wear layer; each release

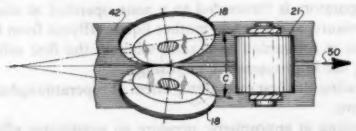
tape defining a free part of said wear layer disposed thereagainst; and means forming a compressible backing material against said bottom surface and against said tapes so that each of said tapes isolates a portion of said backing material from said wear layer and is sandwiched therebetween; the improvement comprising; a tenter assembly defined as a part of said moving means with said tenter assembly having means for stretching and holding said wear layer at a precise width to enable fixing each of said release tapes at a precise location thereagainst; adjustment means for each of said devices to enable adjustment thereof relative to said wear layer and fixing of an associated tape at said precise location adjacent an associated side edge portion; a trimming apparatus having a pair of cutting means for cutting through said wear layer, tapes, and backing material; and means for positioning each cutting means to define the width of said carpeting strip and assure a predetermined required width of release tape remains on each side edge portion of said carpeting strip after cutting by said cutting means while providing each of said side edge portions with a precision planar cut side edge defined by an edge of said wear layer, release tape, and backing material disposed in coplanar relation; said positioning means being adapted to be operated independently of said tenter assembly; a pair of photoelectric devices each disposed along a side edge portion of said carpeting strip; each of said devices detecting associated release tape in its sandwiched position to assure presence of a required width thereof during continuous making of said carpeting strip and after cutting by said cutting means; and a carpeting strip marking mechanism operatively connected to each of said photoelectric devices; said marking mechanism being actuated by either of said photoelectric devices and providing a continuous marking of said carpeting strip in response to detection of the required width of release tape by each photoelectric device; said marking mechanism ceasing its marking once a photoelectric device detects that said required width is no longer present; said carpeting strip being particularly adapted to have a cut side edge thereof disposed in abutting relation against a substantially identical carpeting strip having a substantially identical cut side edge by removing said tape from said carpeting strip and a similar tape from said identical carpeting strip and bonding said free parts of said wear layers together against support means briding an isolated portion of backing material of said carpeting strip and a similar isolated portion of backing material of said identical carpeting strip.

4,231,836

SYSTEM FOR AUTOMATIC JOINING AND ROLLING UP OF CORD STRIPS

Stig-Ove E. Ljungqvist; Bernth S. Hammarström, and Sture F. E. Fritjofsson, all of Gislaved, Sweden, assignors to Gislaved AB, Gislaved, Sweden

Filed Feb. 2, 1979, Ser. No. 8,954
Int. Cl.[3] B29H 9/04
U.S. Cl. 156—405 P **13 Claims**



1. Apparatus for automatically joining cord strips (42,43) for tires, such as vehicular tires, comprising:

a stationary table (12);

conveying means (2) for conveying a cord strip (42) to said stationary table (12);

guide means (16) mounted above said conveying means; and

a joining device (4) movably mounted above said conveying means (2) and being movable into and out of registration with said stationary table (12), said joining device comprising a movable carriage (17) movably mounted on said guide means so as to move in a line above the joining line of said cord strips to be joined;

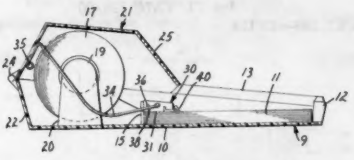
said joining device further comprising a spring loaded roller (21) on said movable carriage which is spring loaded in a downward direction toward said stationary table; and a pair of pulleys (18) located behind said spring loaded roller (21) in the direction of movement of said joining device during a joining operation, said pulleys being obliquely mounted at an angle toward each other and each having a circumferential bearing surface for engaging respective ends of cord strips to be joined to draw said respective ends together substantially when said roller and pulleys are rolled over the ends of said cord strips to be joined during movement of said carriage (17) on said guide means, said obliquely mounted pulleys having substantially conical shaped circumferential portions on the inner facing adjacent surfaces thereof such that the inner parts of said pulleys have an extended common contact surface (18a), said spring loaded roller (21) pressing down said ends of said cord strips to be joined on said stationary table (12) and said trailing pair of pulleys (18) drawing together said pressed down edges of said respective cord strips to join said respective edges by the adhesiveness of said strip edges combined with the pressure imparted thereto by said obliquely mounted pulleys (18).

4,231,837

NOTEPAPER DISPENSER AND TAPE TABBER

Joseph F. Ramey, West St. Paul; George A. Seiler, St. Paul, and Dorman N. Thompson, Jr., St. Croix Beach, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 20, 1978, Ser. No. 962,059
Int. Cl.[2] B32B 31/18
U.S. Cl. 156—522 **5 Claims**



1. A notepaper dispenser comprising a frame having a support surface for a stack of sheets with one end in register,

means for rotatably supporting a roll of pressure-sensitive adhesive tape,

an applicating member having a planar surface positioned on said frame above said sheets and adjacent said one end of said sheets,

means supporting said applicating member for movement toward and away from the upper sheet of a said stack of sheets on said support surface for applying the free end of a said roll of tape successively to a said upper sheet, said support surface having a length and width substantially greater than the size of said applicating member and the width of said tape, and

cutting means for cutting a length of tape, said cutting means being positioned on said applicating member adjacent an edge of said planar surface, which edge is spaced along the path of said tape from said means for supporting said roll of tape beyond said planar surface.

4,231,838
METHOD FOR FLUX GROWTH OF KTiOPO$_4$ AND ITS ANALOGUES

Thurman E. Gier, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

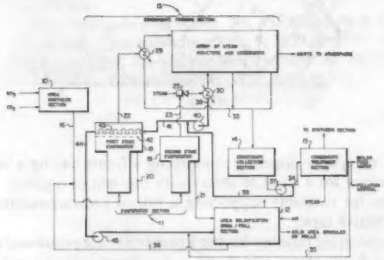
Filed Apr. 20, 1978, Ser. No. 898,444
Int. Cl.^{2} B01J *17/04, 17/20*
U.S. Cl. 156—600 **9 Claims**

1. In an improved process for producing a single crystal of $MTiOXO_4$ by combining and heating starting materials comprising $MTiOXO_4$ and a nonaqueous flux M/X/O, or their precursors, where M is selected from the group consisting of K, Rb and Tl and X is selected from the group consisting of P and As, said process being carried out either by (a) heating the combined starting materials, in such amounts that the ratio of $MTiOXO_4$ to flux at the highest heating temperature is greater than the saturation value, in a temperature gradient wherein the hot zone is within the range about 800° C. to about 1000° C. and the cold zone is within the range about 10° C. to about 135° C. cooler than the hot zone so as to produce a nonaqueous melt; maintaining the temperature gradient for about 3 days to about 3 weeks to allow crystal growth; and cooling and recovering crystalline $MTiOXO_4$, or (b) uniformly heating the combined starting materials, in such amounts that the ratio of $MTiOXO_4$ to flux at the highest heating temperature is less than the saturation value, to a temperature within the range about 700° C. to about 1100° C. until a clear nonaqueous solution is produced; slowly cooling the solution at a rate no greater than 5° C. per hour to effect crystallization of $MTiOXO_4$; and recovering crystalline $MTiOXO_4$, the improvement characterized in that the composition of the combined starting materials is within the trigonal regions ABC, DEF, GHI, JKL, MNO, PQR or STU of FIGS. 1 to 7, respectively, wherein the $Pna2_1$-type $MTiOXO_4$ is the only stable solid phase in equilibrium with the molten flux.

4,231,839
AFTER-TREATMENT PROCESSES AND APPARATUS, ESPECIALLY FOR UREA AND AMMONIUM NITRATE PLANTS

John W. Barron, Rockaway, N.J., and William H. Van Moorsel, Medicine Hat, Canada, assignors to CF Industries, Inc., Chicago, Ill.

Filed Jan. 30, 1979, Ser. No. 7,748
Int. Cl.^{2} C07C *126/00*
U.S. Cl. 159—47 UA **16 Claims**



1. In a urea process of the kind in which product from a synthesis section is passed through at least one evaporator section for concentration prior to delivery to a solidification section, and in which said evaporator section has a vaporous overhead stream containing entrained urea, CO_2, NH_3, and H_2O, and further in which at least part of said evaporator section overhead stream is condensed to produce a derivative condensate stream containing dissolved entrained urea, CO_2, and NH_3; the improvement comprising:

(a) bringing said vaporous overhead stream from said evaporator section into mass and heat transfer relationship with a stream consisting at least in part of said derivative condensate stream without materially transferring H_2O from said overhead stream to said condensate stream, to thereby:

(i) reduced the entrained urea in said overhead stream and enrich the condensate in urea;

(ii) reduce the temperature of said overhead stream and add heat to said condensate stream; and

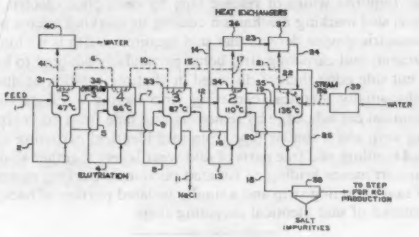
(iii) desorb CO_2 and NH_3 from said condensate stream into said overhead stream; and

(b) delivering the urea-rich and CO_2, NH_3-lean condensate stream resulting from said mass and heat transfer step as a stream separate from concentrated product from said evaporator to said solidification section for processing there along with concentrated product from said evaporator.

4,231,840
METHOD OF CONCENTRATING AN AQUEOUS SOLUTION BY MULTIPLE EFFECT EVAPORATING

Donald H. Geesen, Wilcox, Canada, assignor to PPG Industries Canada Ltd., Regina, Canada

Filed Feb. 1, 1979, Ser. No. 8,358
Int. Cl.^{2} B01D *1/26*
U.S. Cl. 159—47 R **3 Claims**



1. In a method of concentrating an aqueous solution containing a first salt and a second salt, the solubility of the first salt increasing more with increasing temperature than the solubility of the second salt, by multiple effect evaporation wherein the multiple effect evaporators comprise at least three evaporator effects, wherein the multiple effect evaporators are backward fed, wherein the first evaporator effect is the hottest, wherein second salt is precipitated during evaporation, wherein the concentrated mother liquor from the multiple effect evaporators is forwarded to a zone operated at atmospheric pressure, and wherein mother liquor effluent from the evaporators is forwarded to a zone wherein the first salt is recovered, the improvement comprising:

A. Operating the first evaporator effect at superatmospheric pressure;

B. Operating at atmospheric pressure an evaporator effect which is preceeded in the direction of mother liquor effluent flow by at least one cooler evaporator effect;

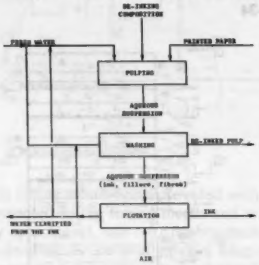
C. Feeding to the first evaporator effect a portion of the overflow from the evaporator effect cooler than the evaporator effect operated at atmospheric pressure, wherein the portion bypasses the evaporator effect operated at atmospheric pressure; and

D. Feeding the mother liquor effluent from the first evaporator effect to the evaporator effect operated at atmospheric pressure.

4,231,841
PROCESS FOR THE DE-INKING OF PRINTED WASTE PAPER

Giulio Calmanti; Salvatore Gafa, both of Milan; Giovanni M. Dadea, Tradate; Alfonso Gatti, Novi Ligure, and Fulvio Burzio, Milan, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Oct. 17, 1978, Ser. No. 952,200
Claims priority, application Italy, Oct. 20, 1977, 28816 A/77; Sep. 1, 1978, 27242 A/78
Int. Cl.³ D21C 5/02
U.S. Cl. 162—5 5 Claims



1. In a washing process for de-inking printed waste paper comprising pulping a printed waste paper as an aqueous alkaline suspension in the presence of a de-inking composition and washing the pulped paper with water, thereby obtaining a thickened suspension of paper in water separate from the washing waters which consist of another more dilute suspension containing ink, fillers, and a small amount of residual paper fibers, the improvement comprising

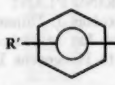
(1) using as said de-inking composition, a de-inking composition consisting essentially of:

(A) a salt of a fatty acid of the formula: R—COO—M wherein R represents one or more hydrocarbon chains selected from the class consisting of saturated and/or unsaturated hydrocarbons; and M represents a metal selected from the class consisting of Na and K; said fatty acid salt being present in an amount between 5% and 32% with respect to the weight of the entire composition;

(B) a nonionic ethoxylated and/or propoxylated surfactant of the formula:

$$R^1O-(CH-CH_2O)_n-H \quad (Y)$$

wherein: Y is either H or CH_3; R^1O represents the hydrophobic moiety of the molecule and is derived from a compound selected from the class consisting of alkylphenols of formula



saturated primary fatty alcohols of formula R''—CH_2OH; saturated secondary fatty alcohols of formula

$$R'''-CH(OH)-R^{IV}$$

fatty acids of the formula R^V—COOH; and mixtures thereof, wherein R', R'', R''', R^{IV} and R^V are alkyl chains; and

n is a number between 2 and 40; said nonionic surfactant being present in an amount between 5% and 25% by weight of the entire composition;

(c) an anionic surfactant selected from the class consisting of sulphonates of the formula R^2—SO_3—M'; sulphates of formula R^3—O—SO_3—M'; and mixtures thereof, wherein:

R^2 is selected from the class consisting of linear paraffin chains, olefin chains, and alkylaryl chains;

R^3 is a paraffin chain; and

M' is selected from the class consisting of Na, K, NH_4 and mono-, di- and tri-substituted alkylamines;

said anionic surfactant being present in an amount between 2% and 8% with respect to the weight of the entire composition;

(D) a sodium-carboxylmethyl-cellulose in an amount between 1% and 5% with respect to the weight of the entire composition; and

(E) an alkaline inorganic salt selected from the class consisting of metasilicate, disilicate, carbonate, borate and polyphosphates, said alkaline inorganic salt being present in an amount between 30% and 80% of the entire composition; the percentages of the components (A), (B), (C), (D), and (E) totaling essentially 100%, said composition being present in an amount of about 1 to about 6% by weight with respect to said paper and the pH during the pulping being from about 9 to about 12;

(2) injecting air or another inert gas in a flotation unit, into the other more dilute suspension coming from the washing operations, to cause a flotation in an alkaline medium at a pH of about 9, without the addition of flocculants resulting in the formation of two phases, the upper-most phase containing ink;

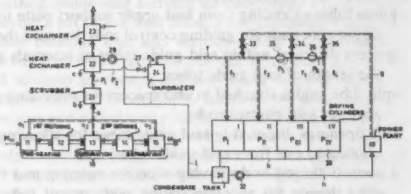
(3) skimming said upper-most phase; and

(4) at least partially recycling the lower-most phase comprising de-inked clarified water, residual paper fibers, and fillers in diluted form to the pulping and washing operations.

4,231,842
RECOVERY OF THERMAL ENERGY FROM A THERMOMECHANICAL PULP PLANT

Pertti Ojala, Turku, Finland, assignor to Valmet Oy, Finland

Filed Jun. 7, 1978, Ser. No. 913,327
Claims priority, application Finland, Dec. 22, 1977, 773916
Int. Cl.³ D21B 1/12; D21F 5/20
U.S. Cl. 162—47 11 Claims



1. A method of recovering the thermal energy contained in the pressurized process steam generated by a plant in the production of thermomechanical pulp, by utilizing it in the drying section of a paper manufacturing machine, said method comprising the steps of:

(a) applying the process steam to the primary side of a heat exchanger;

(b) applying water to the secondary side of the heat exchanger to produce hot water;

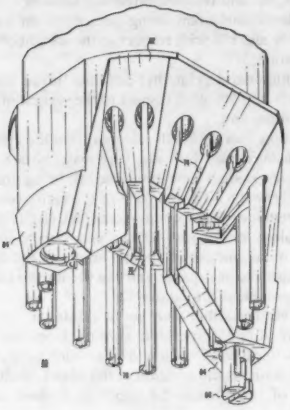
(c) vaporizing the water to produce clean steam; and

(d) utilizing the clean steam to at least a first steam group of the drying section of the paper manufacturing machine, without increasing pressure.

4,231,843
GUIDE TUBE FLOW DIFFUSER

Donald L. Myron, Pensacola, and Robert T. Berringer, Gulf Breeze, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 2, 1977, Ser. No. 821,101
Int. Cl.[2] G21C *15/00*
U.S. Cl. 176—50 1 Claim



1. A nuclear reactor having a guide tube flow diffuser including a reactor vessel with a closure head disposed thereon, an array of fuel assemblies and control assemblies mounted within said reactor vessel between a lower core plate and an upper core plate, an inlet and an outlet disposed on said reactor vessel for circulating a coolant in heat transfer relationship with said fuel assemblies and said control assemblies, an upper support plate attached to said reactor vessel above said upper core plate defining an outlet plenum therebetween, a plurality of support columns supported by said upper support plate and extending downward to said upper core plate for supporting said upper core plate, comprising:

guide tubes extending from said upper support plate to said upper core plate for guiding control rods disposed therein;

spacers disposed within said guide tubes at intervals along the length of said guide tubes;

split tube guides attached to said spacers for providing guidance for said control rods;

side openings disposed in said guide tubes for allowing said coolant to exit from said guide tubes; and

a conical shaped body having a center opening and radial slots therein for accommodating said control rods, said conical shaped body having a plurality of sloped sides terminating above said core plate and surrounding said center opening with said sloped sides having a flat lower surface substantially parallel to said core plate for diverting the upward flow of said coolant around the outside of said guide tubes, thereby reducing the flow of said coolant through said side openings and thus improving the guidance of said control rods;

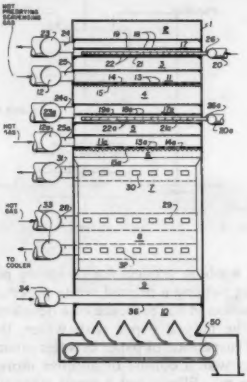
legs having at least one sloped side extending from said body to near said upper core plate for providing attachment to said upper core plate; and

pins disposed in said legs for engaging said upper core plate thereby maintaining proper alignment between said guide tubes and said upper core plate.

4,231,844
METHOD AND APPARATUS FOR PRODUCING ABRASION RESISTANT COKE FROM BROWN COAL BRIQUETS

Heinrich Weber, Recklinghausen; Kurt Lorenz, Hattingen; Horst Dungs, Herne; Roman Kurtz, and Hans-Joachim Kersting, both of Frechen, all of Fed. Rep. of Germany, assignors to Firma Carl Still GmbH & Co. KG and Rheinische Braunkohlwerke AG, both of, Fed. Rep. of Germany

Filed Mar. 9, 1979, Ser. No. 18,870
Claims priority, application Fed. Rep. of Germany, Mar. 18, 1978, 2812005
Int. Cl.[3] C10B *49/06, 3/00, 53/08*
U.S. Cl. 201—34 6 Claims



1. In a combination with a method of producing abrasion resistant coke from brown coke briquets in a shaft furnace of the type having a top inlet for receiving a charge of the coal briquets and a bottom outlet for removing the coke in which the brown coke briquets are serially preheated, and, carbonized and cooled in stages by directing inert hot combustion gases into the furnace in contact with the briquets, and with the gas removed and recirculated in circuits for each of the respective preheating, drying and carbonizing stages in which there is recirculated gas substantially composed of inert hot combustion gases obtained from the carbonizing of the brown coke briquets, the improvement comprising introducing additional inert hot combustion gases into the furnace in said preheating and drying stages at a temperature and in an amount sufficient to raise the temperature of the circulating gases removed from the respective preheating and drying stages to at least 20C.° above steam saturation temperature of the combined gases.

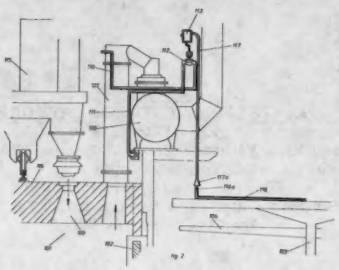
4,231,845
EQUIPMENT FOR EMISSION-FREE OPERATION OF A COKING PLANT

Timen Vander, Ursem; Nicolaas J. Thijssen, Santpoort; Jan F. de Blok, Beverwijk, and Jan Middel, Nieuwe Sluis, all of Netherlands, assignors to Hoogovens Ijmuiden, B.V., IJmuiden, Netherlands

Division of Ser. No. 870,138, Jan. 17, 1978, abandoned. This application Jun. 18, 1979, Ser. No. 49,115
Claims priority, application Netherlands, Jan. 24, 1977, 7700675
Int. Cl.[2] C10B *27/00, 27/04, 41/06, 41/08*
U.S. Cl. 202—113 2 Claims

1. Coking plant comprising a plurality of coking chambers for the coking of coal by dry distillation, a mobile coke pusher machine for removing coke, a coal leveller bar carried thereby, an ascension pipe for each chamber for the discharge from the chamber of the gases evolved during coking, means for injecting steam into the ascension pipe so as to create a sub-atmos-

pheric pressure in the chamber and adjustable pneumatically actuated timing means after the chamber has been charged with coal stopping the injection of steam to the ascension pipe of that chamber when a period of time has elapsed following the commencement of the coking process in the chamber, determined by the step of levelling of the coal charged into the



chamber, said timing means being provided with an air conduit which is connected to the timing means and which ends in a downwardly open funnel, said coke pusher machine bearing an upwardly extending air conduit nozzle, adapted to register with said funnel, to deliver an air pulse, transmitted by the air conduit to actuate the timing means.

4,231,846

PLUG FOR PROTECTING COKE-OVEN CHAMBER DOORS FROM THE ACTION OF THE INTERNAL TEMPERATURE IN THE OVEN

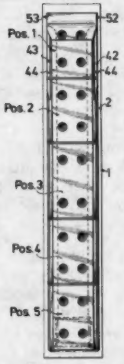
Hans Mathiak, Bönen, and Hans Oldengott, Bockum-Hövel, both of Fed. Rep. of Germany, assignors to Ruhrkohle, AG., Essen, Fed. Rep. of Germany

Filed May 31, 1978, Ser. No. 911,237

Claims priority, application Fed. Rep. of Germany, Jun. 2, 1977, 2724982

Int. Cl.[2] C10B *25/06, 25/18*

U.S. Cl. 202—248 **12 Claims**



1. A plug for protecting a coke-oven chamber door from heat within the oven, said plug comprising a plurality of vertically stacked refractory bricks mountable on the inside of said door: said bricks having first and second spaced, parallel vertical faces, said second face being abutable with said door and said first face facing away from said door; said faces being joined by side walls, said side walls including short transition portions joined to said first face and converging in a direction away from said door, said side walls having adjacent portions joined to said transition portions, said adjacent portions being longer than said transition portions and converging in a direction away from said door but at a smaller angle than said transition portions, said side walls further including diverging portions joined to said adjacent portions and to said second face, said diverging portions diverging in a direction away from said door, the uppermost brick in said stack having a surface intersecting said first face and side walls which forms a part of the upper end face of the plug and which extends obliquely upward from said first face in a direction toward the door; said diverging portions of said side walls ending below the intersection of said oblique surface and said first face, said plug having a downwardly extending tar discharge chute formed in each side wall of said plug; the lowermost brick in said stack being supportable on said door; the height of an intermediate one of said bricks being selected in accordance with the desired height of said plug; and said bricks having recesses therein receiving a plurality of countersunk bolts extending through said bricks and engageable with said door for fastening said bricks to the door.

4,231,847

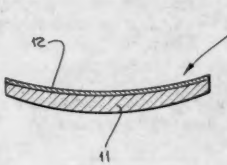
ELECTRODEPOSITION OF NICKEL-IRON ALLOYS HAVING A LOW TEMPERATURE COEFFICIENT AND ARTICLES MADE THEREFROM

Kenneth Lui, Fountain Valley, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Continuation-in-part of Ser. No. 775,310, Mar. 7, 1977, abandoned. This application Jun. 21, 1978, Ser. No. 917,779

Int. Cl.[2] C25D *1/02, 1/06, 3/56*

U.S. Cl. 204—7 **5 Claims**



1. A method of electrodepositing on an electrically conductive substrate an electrodeposited substantially homogeneous admixture of nickel and iron, said homogeneous admixture containing substantially no iron oxide, said mixture having a temperature expansion coefficient of less than about 5×10^{-6}, said method comprising forming an electrolytic aqueous solution having a pH of less than about 3 and consisting essentially of nickel chloride ions and ferrous sulfate ions containing substantially no iron oxide, the amount of ferrous ions present in said aqueous electrolyte solution being between about 60 weight percent and 80 weight % based on the total weight of ferrous ions and nickel ions present in said aqueous electrolyte solution and the amount of nickel ions present in said aqueous electrolyte solution being between about 40 weight percent and 20 weight percent based on the total weight of ferrous ions and nickel ions present in said aqueous electrolyte solution, said electrolytic solution being in contact with an anode, said anode consisting essentially of iron and nickel, the amount of iron and nickel in said anode being substantially the same weight percent as the amount of nickel and iron in the electrodeposited homogeneous admixture of nickel and iron, said anode being electrically connected to a source of electric potential; contacting said electrically conductive substrate with said electrolytic solution, said substrate functioning as a cathode when electric current is passed through said anode, said aqueous electrolytic solution and said substrate; conducting an electric current through said anode, electrolytic solution and substrate; excluding free oxygen from said electrolytic solution while said current is being conducted therethrough; discontinuing the conduction of said electric current through said anode, electrolytic solution and substrate when a predeter-

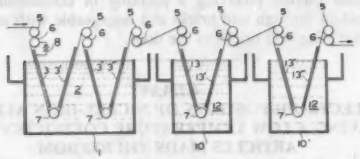
mined amount of said nickel ions and ferrous ions are electrodeposited on said substrate; and removing said substrate from contact with said electrolytic solution.

4,231,848

METHOD FOR MAKING A RAW BOARD FOR USE IN PRINTED CIRCUITS

Yoshio Kawasumi, and Haruki Sato, both of Saitama, Japan, assignors to Nippon Mining Co., Ltd., Tokyo, Japan

Filed May 3, 1979, Ser. No. 35,695
Claims priority, application Japan, May 8, 1978, 53-53705
Int. Cl.³ C25D *5/10, 5/56*
U.S. Cl. 204—20 **9 Claims**



1. A method for preparing a raw board for use in printed circuits comprising the steps of:

(A) depositing copper layer onto a film or sheet of synthesized resins;

(B) subjecting said copper-deposited film or sheet to an electrochemical treatment at a temperature between 40° C. and 90° C. with a first electroplating bath containing copper sulfate, sulfuric acid, chlorine ion and a surface glazing agent including thiourea; and

(C) subjecting thereafter the film or sheet to an electrochemical treatment with a second electroplating bath containing copper sulfate and sulfuric acid.

4,231,849

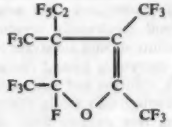
PROCESS FOR THE PREPARATION OF A PERFLUORINATED CYCLIC ETHER

John Hutchinson, and Graham Whittaker, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 909,180, May 24, 1978, abandoned.
This application Jun. 18, 1979, Ser. No. 49,787
Claims priority, application United Kingdom, Jun. 9, 1977, 24084/77
Int. Cl.³ C07D *307/38*
U.S. Cl. 204—59 F **6 Claims**

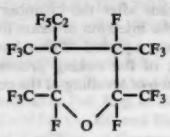
1. A process for the preparation of a perfluorinated cyclic ether which comprises:

(a) subjecting the pentamer of tetrafluoroethylene to a single step process of hydrolysis and cyclisation by adding a tertiary nitrogen base to a dispersion of the pentamer and a polar aprotic organic solvent in water at a temperature of from 0° C. to 50° C. to obtain the $C_{10}F_{18}O$ ether of formula



; and

(b) perfluorinating the ether obtained in step (a) to obtain a perfluorinated cyclic $C_{10}F_{20}O$ ether having the formula:

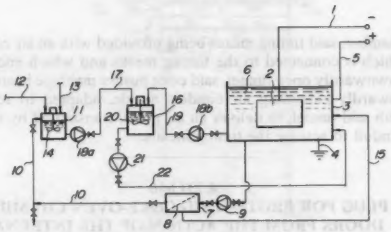


4,231,850

PROCESS FOR A CATIONIC CATHODIC ELECTROCOAT

Hironobu Kato, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Apr. 11, 1979, Ser. No. 28,939
Claims priority, application Japan, Apr. 12, 1978, 53-42086
Int. Cl.³ C25D *13/04, 13/12*
U.S. Cl. 204—181 C **9 Claims**



1. A process for cationic cathodic electrocoating, comprising the steps of:

cathodically electrocoating a first cationic electrodepositable paint composition having a pH value between about 6.0 and 8.0 and a first neutralization equivalent;

filtering said cationic electrodepositable paint composition to produce a filtrate;

mixing said filtrate with a second electrodepositable paint composition having a second neutralization equivalent lower than said first neutralization equivalent to obtain a dispersion;

homogeneously diluting said dispersion with a portion of said first electrodepositable paint composition to obtain a supplemental feed electrodepositable paint composition; and

periodically supplementing said first electrodepositable paint composition with said supplemental feed paint composition, whereby the properties of said first electrodepositable paint composition are maintained.

4,231,851

METHOD FOR ELECTROCHEMICALLY COATING A METALLIC SUBSTRATE WITH A PROTECTIVE FILM OF A PHENOLIC RESIN

Giuliano Mengoli, Padua; Sergio Daolio, Luzzara; Ugo Giulio, Testona, and Carlo Folonari, Turin, all of Italy, assignors to Centro Ricerche Fiat S.p.A., Orbassano and Consiglio Nazionale Delle Ricerche, Rome, both of, Italy

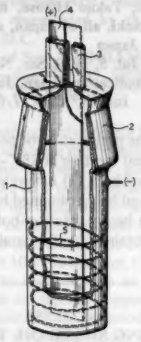
Filed Apr. 6, 1979, Ser. No. 27,700
Claims priority, application Italy, Apr. 10, 1978, 67788 A/78
Int. Cl.³ C25D *9/02, 13/08*
U.S. Cl. 204—181 R **9 Claims**

1. A method for electrochemically coating a metallic substrate utilized as anode in an electrochemical cell in which a direct current flow of electrical energy is passed from a cathode to said anode through a liquid alkaline-reacting electrolyte comprising at least one phenolic monomer and a basic substance dissolved in a normally liquid solvent, thereby to pro-

gressively form on said substrate an impervious adherent polymeric film of a phenolic resin, wherein the improvement comprises:

(a) the solvent is water, an alcohol having from 1 to 4 carbon atoms, or a mixture of the two;

(b) the phenolic monomer comprises phenol in an amount of from 50 to 250 g per liter electrolyte, and at least one



halo-, alkoxy- or alkyl-substituted phenol in an overall amount of from 5 to 35 g per liter electrolyte, the substituent being in an ortho- or meta- position;

(c) the basic substance comprises an alkylene diamine in an amount of from 1 to 10 vol.% referred to the electrolyte;

(d) the direct current flow density does not exceed 10 mA/sq.cm. of the metallic substrate.

4,231,852

DEVICE FOR CATHODIC CORROSION PROTECTION EMPLOYING AN EXTERNAL CURRENT ANODE

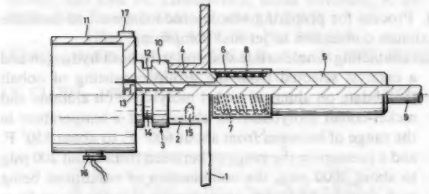
Hans Ruckert, Dortmund, Fed. Rep. of Germany, assignor to Vereinigte Elektrizitätswerke Westfalen AG, Dortmund, Fed. Rep. of Germany

Continuation of Ser. No. 764,740, Feb. 1, 1977, abandoned. This application Jul. 17, 1978, Ser. No. 925,298

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1976, 2605088

Int. Cl.² C23F *13/00*

U.S. Cl. 204—196 **5 Claims**



1. In combination, a hot water tank having a passive anticorrosive layer on an inner wall of the tank and a device for cathodic corrosion protection of said hot water tank device, the protection device including the use of an external current anode and comprising:

a holder adapted for insertion into a wall of said tank;

an external current anode disposed on said holder;

a reference electrode also disposed on said holder;

potentiostat means connected to the reference electrode and to the anode and connected to the tank wall for measuring a potential between the reference electrode and the tank wall and for continuously varying electrical current flow through said current anode sufficiently to keep said potential substantially constant; and

an insulating piece being provided between the reference electrode and the external current anode and which extends into the tank;

wherein the insulating piece has an extension substantially perpendicular to the tank wall when inserted therein, said extension being at least a multiple of the length of the free end of the reference electrode from the tank wall; wherein the external current anode extends centrally through the insulating piece; and wherein said insulating piece has an annular recess, and the reference electrode is arranged in helical or ring form in an annular recess of the insulating piece, said recess being covered by the flow-reducing sheathing.

4,231,853

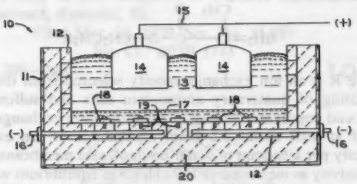
CATHODIC CURRENT CONDUCTING ELEMENTS FOR USE IN ALUMINUM REDUCTION CELLS

Henry W. Rahn, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Apr. 27, 1979, Ser. No. 33,782

Int. Cl.² C25C *3/16*

U.S. Cl. 204—243 R **7 Claims**



1. In an electrolytic metal reduction cell wherein molten metal is produced by electrolyzing between active anodic and cathodic surfaces a compound of the metal dissolved in a molten solvent said molten metal collecting in a pad on the floor of the cell said cell comprising carbon-lined side walls and a floor defining a chamber containing the molten constituents, anode means suspended in said chamber, cathode current supply means imbedded in the carbon lining by which electric current is conducted from the cathode current supply means through the carbon lining to the pool of molten metal, the improvement residing in the provision of means for reducing the voltage loss from the cathode current supply means to the active cathodic surface said means provided by at least one plate or tile-shaped element held in loosely restrained physical engagement with the surface of the carbon lining of the floor of the cell by means of at least one pin, said pin extending through an aperture formed in said plate or tile, the lower end of said pin being inserted in the carbon lining thereby restraining lateral movement of said plate or tile with respect to the vertical axis of the pin said plate or tile and associated pin being formed of an electrically conductive refractory hard metal.

4,231,854

ANODE FOR CATHODIC ELECTROCOATING

Klaus Boehlke, Hessheim, and Fritz E. Kempter, Mannheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 16, 1978, Ser. No. 951,565

Claims priority, application Fed. Rep. of Germany, Oct. 21, 1977, 2747334

Int. Cl.³ C04B *35/26, 35/54;* C25B *11/12, 11/16*

U.S. Cl. 204—294 **14 Claims**

1. An anode for cathodic electrocoating, which comprises a mixture of

(A) from 60 to 90% by weight of magnetite or a magnetite/-natural graphite mixture and
(B) from 40 to 10% by weight of a plastic.

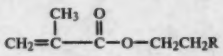
4,231,855

ELECTRODIALYSIS MEMBRANES OF HIGH INTERSTITIAL MOLALITY BASED UPON METHACRYLATE ESTER DERIVATIVES

Russell B. Hodgdon, Sudbury, and Samuel S. Alexander, Boxboro, both of Mass., assignors to Ionics, Incorporated, Watertown, Mass.

Continuation-in-part of Ser. No. 935,438, Aug. 21, 1978, abandoned. This application Mar. 2, 1979, Ser. No. 16,994
Int. Cl.³ B01D *13/02*
U.S. Cl. 204—301 **2 Claims**

1. An ion exchange resin membrane consisting of a copolymer of about 35 to about 50 mol percent of at least one compound selected from the group consisting of ethylene glycol dimethacrylate, neopentyl glycol dimethacrylate, polyethylene glycol dimethacrylate, trimethylol propane trimethacrylate, bis-phenol A dimethacrylate, pentaerythritol trimethacrylate and pentaerythritol tetramethacrylate with about 65 to about 50 mol percent respectively of a methacrylate ester salt having the chemical formula:



where R is an ion exchange moeity selected from the group consisting of quaternary ammonium salts and sulfonic acid salts, said copolymer having an interstitial ion exchange molality of at least about 2.2 gram equivalents of ion exchange capacity per kilogram of water content, said membrane having a resistivity as measured at 1000 Hertz in equilibrium with 0.01 N sodium chloride solution at room temperature of less than about 30 ohm cm.^{2}.

4,231,856

PURIFYING FILTER-CLOGGING COAL TAR FORMED FROM LOW-TEMPERATURE COAL CARBONIZATION

Ingo Romey, Hünxe, and Hellmüt Kokot, Essen, both of Fed. Rep. of Germany, assignors to Bergwerksverband GmbH, Essen, Fed. Rep. of Germany

Continuation of Ser. No. 845,454, Oct. 25, 1977, abandoned, which is a continuation of Ser. No. 682,171, Apr. 30, 1976, abandoned. This application Mar. 5, 1979, Ser. No. 17,134
Claims priority, application Fed. Rep. of Germany, May 13, 1975, 2521117
Int. Cl.² C10C *1/00*
U.S. Cl. 208—39 **8 Claims**

1. A process for purifying filter-clogging coal tar residues of the type obtained by low-temperature carbonization of coal, and including viscous organic coal tar constituents, particulate solid impurities and liquid water, the process comprising the steps of heating coal at 450°–700° C. and at least substantially in the absence of air to thereby decompose the coal and obtain products including coal tar which contains liquid water, particulate solid impurities, and viscous organic coal tar constituents including light oils which tend to combine with the liquid water to produce a filter-clogging emulsion; heating the thus-formed coal tar to a temperature above the boiling point of water and sufficiently high to thereby distill off substantially all of the water and the light oils so as to obtain an intermediate product of increased viscosity and which is substantially free from the presence of liquid water and of the light oil constituents which in combination form the filter-clogging emulsion; and subsequently filtering the intermediate product without the use of a diluent to thereby separate the particulate solid impurities from the undistilled viscous constituents of the coal tar, the filtration without the use of a diluent being possible due to the elimination of light oils and water and the consequent absence of filter clogging which would otherwise result from the combination of the light oils with water onto a filter-clogging emulsion.

4,231,857

PROCESS FOR PREPARING PETROLEUM-DERIVED BINDER PITCH

Osamu Kato, Yokohama; Seiichi Uemura; Syunichi Yamamoto, both of Kawasaki; Takao Hirose, Kamakura, and Hiroaki Takashima, Kawasaki, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Filed Jul. 5, 1979, Ser. No. 55,052
Claims priority, application Japan, Jul. 14, 1978, 53-85044
Int. Cl.³ C10C *1/00*
U.S. Cl. 208—40 **8 Claims**

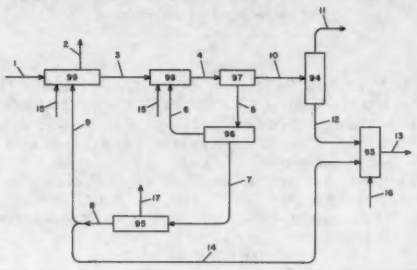
1. A process for the preparation of petroleum-derived binder pitch, comprising heat treating at 380°–500° C. for 15 minutes-20 hours a mixture of both (1) a heavy fraction boiling at not lower than 200° C. and being obtained by the steam cracking of petroleum and (2) a heavy fraction boiling at not lower than 200° C. and being obtained by the catalytic cracking of petroleum.

4,231,858

PROCESSING SHALE OIL TO JET FUEL

Walter H. Seitzer, West Chester, and Abraham Schneider, Overbrook Hills, both of Pa., assignors to Suntech, Inc., Philadelphia, Pa.

Continuation-in-part of Ser. No. 766,113, Feb. 7, 1977, abandoned. This application Jun. 15, 1978, Ser. No. 916,027
Int. Cl.² C10G *23/02, 29/12*
U.S. Cl. 208—89 **11 Claims**



1. Process for preparing whole crude shale oil to facilitate maximum conversion to jet fuel comprising:
(a) contacting whole crude shale oil with both hydrogen and a catalyst selected from the group consisting of cobalt molybdate on alumina, nickel molybdate on alumina and nickel-cobalt molybdate on alumina, at a temperature in the range of between from about 600° F. to about 850° F. and a pressure in the range of between from about 200 psig to about 5000 psig, the combination of conditions being such that the hydrogen consumption is in the range from about 700 to about 3000 standard cubic feet per barrel, until a substantial amount of neutral and acidic nitrogen compounds contained in the oil are converted to basic nitrogen compounds, hydrocarbons and ammonia;
(b) separating the contacted shale oil from the catalyst;
(c) contacting the separated oil with an amount of anhydrous hydrogen chloride at least sufficient to react with the basic nitrogen compounds remaining in said separated oil to form a reaction product, said contacting being carried out at a temperature range wherein the lower temperature is that at which only nominal amounts of wax will precipitate and the upper temperature is that at which only nominal amounts of reaction product resulting from the reac-

tion of the hydrogen chloride and the basic nitrogen compounds will redissolve in the oil; and

(d) separating the oil from the reaction product of step (c).

4,231,859

MOLYBDENITE FLOTATION

Jerry L. Huiatt, Murray; Melvin D. Shurtz, Orem, both of Utah, and George M. Potter, Tucson, Ariz., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Continuation-in-part of Ser. No. 900,838, Apr. 28, 1978, abandoned. This application Nov. 27, 1979, Ser. No. 97,751

Int. Cl.³ B03B *1/00*

U.S. Cl. 209—11 **1 Claim**

1. A process for recovering molybdenite from copper sulfide flotation concentrates containing minor amounts of iron sulfide comprising (1) preparing an aqueous pulp comprising the concentrate and about 0.2 to 1 pound of activated carbon per ton of concentrate, (2) injecting steam into the pulp in an amount and for a time sufficient to raise the temperature to about 70° to 100° C. and to maintain the pulp at this temperature for a period of about 10 to 60 minutes, (3) continuing steam injection while adding to the hot pulp an amount of soluble sulfide reagent sufficient to depress copper and iron sulfides, and conditioning the mixture for a period of about 0.5 to 3 minutes with continued steam injection, and (4) injecting a mixture of steam and air into the hot pulp in an amount sufficient for continued maintenance of the temperature of about 70° to 100° C. and to float a rougher molybdenite concentrate.

4,231,860

FLOTATION MACHINE

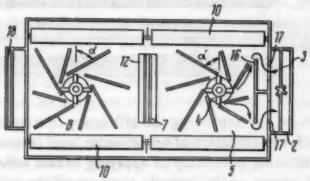
Vyacheslav D. Kuznetsov, ulitsa Akademika Pavlova, 140a, kv. 97; Boris P. Preobrazhensky, viezd Trinklera, 5, kv. 79; Valentin E. Rozhnov, ulitsa Tobolskaya, 52, kv. 10; Jury V. Stepanov, ploschad Rozy Ljuxemburg, 5, kv. 10, all of Kharkov; Anatoly N. Belitsky, ulitsa Deputatskaya, 166, kv. 55, Makeevka Donetskoi oblasti; Viktor N. Beizer, 763 kvartal dom 14, kv. 26, Makeevka Dontskoi oblasti; Grigory A. Tokar, bulvar 8 Sentyabrya, 6, kv. 28, Makeevka Donetskoi oblasti; Ivan K. Plastovets, bulvar 8 Sentyabrya, 14, kv. 1, Makeevka Donetskoi oblasti; Ivan I. Barylo, ulitsa Ostrovskogo, 10/32, kv. 5, Makeevka Donetskoi oblasti; Boris A. Koval, ulitsa Artema, 80a, kv. 86, Donetsk; Sergei F. Chepurnykh, ulitsa Matrosova, 14a, kv. 58, Kharkov; Petr N. Chumachenko, prospekt Traktorostroitelei 107, kv. 204, Kharkov; Nikolai F. Simonov, ulitsa Ivanova, 12/16, kv. 46, Kharkov; Petr P. Kharkhardin, prospekt Kirova, 109, kv. 48, Dnepropetrovsk, and Ilya M. Litmanovich, ulitsa Suvorova, 8, kv. 4, Makeevka Donetskoi oblasti, all of U.S.S.R.

Filed Sep. 20, 1978, Ser. No. 944,129

Claims priority, application U.S.S.R., Sep. 21, 1977, 2524485

Int. Cl.² B03D *1/18*

U.S. Cl. 209—169 **11 Claims**



1. A flotation machine comprising a plurality of cells arranged in series and provided with pulp receiving and discharging devices, wherein each cell comprises: at least two aerators positioned within said cell along a longitudinal axis of said cell and offset toward a respective end wall from a transverse axis of said cell; at least two stator plates fitted with a central opening, each aerator being mounted in spaced relationship with a respective stator plate and above said central opening of said respective stator plate; vertical blades mounted on each stator plate at an angle to a vertical plane passing through a center point of a respective aerator; first regulating means positioned intermediate a gap defined between said stator plates along the flow direction of said pulp for regulating longitudinal recirculating flows of said pulp; second regulating means positioned between side walls of said cell and said stator plates for regulating transverse flows of said pulp; and froth-removing means positioned above said stator plates in an upper part of said cell.

4,231,861

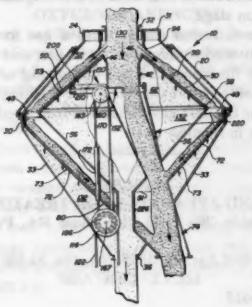
GRAIN CLEANING APPARATUS

Steven G. Hannie, Bloomington, and Terry D. Tucker, East Peoria, both of Ill., assignors to Parsons Manufacturing, Incorporated, Roanoke, Ill.

Filed Mar. 26, 1979, Ser. No. 24,057

Int. Cl.³ B07B *1/46*

U.S. Cl. 209—240 **7 Claims**



1. In a grain cleaning apparatus for removing fine foreign material from grain, said apparatus being of the type having an upright housing, at least one layer of inclined screens within said housing, said screens supporting grain for gravity flow while foreign material passes therethrough, at least one wall disposed below said screen layer, said wall cooperating with said screen layer to define a foreign material receiving chamber, a grain inlet disposed above and communicating with said screen layer to deliver grain for gravity flow over said screens in a relatively thin layer, a grain outlet disposed below and communicating with said screen layer, and a foreign material outlet communicating with said foreign material receiving chamber, said grain outlet being distinct and separate from said foreign material outlet, and means for selectively directing all of said grain over said screens or permitting all of said grain to bypass said screens, the improvement which comprises:

means for directing only a selected proportion of grain flowing through said grain inlet to said screen layer and simultaneously directing the remainder of said grain flowing through said grain inlet to said grain outlet without said grain passing over said screens; and

a grain segregating conduit for carrying said remainder of said grain through said foreign material receiving chamber directly into said grain outlet.

4,231,862

METHOD FOR THE PRESERVATION OF AN ACTIVATED SLUDGE

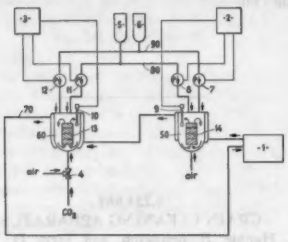
Roberto Mona, Bellinzona, and Jürgen Gnieser, Weinfelden, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Mar. 22, 1979, Ser. No. 22,691

Claims priority, application Switzerland, Apr. 3, 1978, 3530/78

Int. Cl.³ C02F *3/12*

U.S. Cl. 210—601 **11 Claims**



1. A method for the preservation of an activated sludge for the reuse in biological waste water purification stages, comprising the steps of:

storing activated sludge which is to be preserved and subsequently introduced and used in a biological waste water purification stage;

flushing the activated sludge with a gas to preserve the stored activated sludge prior to its use; and

using as the flushing gas a gas containing at least carbon dioxide and to the extent that the flushing gas contains oxygen the flushing gas contains at least a reduced amount of oxygen in relation to air.

4,231,863

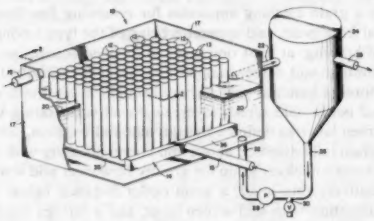
METHOD AND APPARATUS FOR TREATING WATER

Eldon M. Sutphin, 306 Field Club Ridge Rd., Pittsburgh, Pa. 15238

Filed Apr. 26, 1979, Ser. No. 33,350

Int. Cl.² C02C *1/08*

U.S. Cl. 210—615 **25 Claims**



1. Apparatus for treating water containing contaminants comprising:

an enclosure closed on the bottom portion thereof and adapted to hold water therein;

a plurality of substantially vertical open ended conduit members adapted to support biota growth thereon and positioned in mutually adjacent, close packed relationship in adjacent rows of several conduit members each with openings defined between the adjacent conduit members;

gas distribution means having a plurality of gas outlets positioned with at least one gas outlet adjacent the open bottom portion of each conduit member; and

means for maintaining a water level which at least partially immerses the conduit members;

whereby gas may be expelled through the gas distribution orifices into each conduit member to aerate and lift the water to the top portion of the conduit thereby producing flow upward through the conduit members and downward there between thereby exposing the contaminated water to the inner and outer surfaces of the conduit members.

4,231,864

PROCESS FOR PREPARATION OF A WATER FOR HEMODIALYSIS, AND ITS APPLICATION IN RENAL HEMODIALYSIS

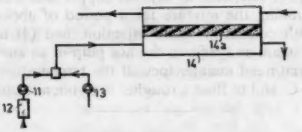
Didier Marty, 6, rue Clémence Isaure, 31000 Toulouse; Albert Abadie, 18, rue de Nimes, 31400 Toulouse, and Michel Mustin, 8, rue du Libre Echange, 31000 Toulouse, all of France

Filed Sep. 25, 1978, Ser. No. 945,296

Claims priority, application France, Oct. 21, 1977, 77 32009

Int. Cl.³ B01D *15/04*

U.S. Cl. 210—669 **12 Claims**



1. A process for preparation of water for hemodialysis comprising fixing acetate anions CH_3COO^- on at least one water insoluble anion-exchange resin and passing potable water containing undesirable anions through a bed of the thus prepared resin and substituting the undesirable anions contained in the initial potable water for the acetate ions fixed on said resin, and using the acetate containing water in a hemodialysis process.

4,231,865

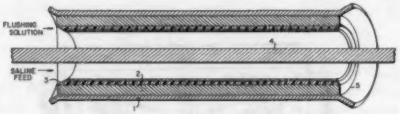
BACKWASHING REVERSE-OSMOSIS AND ULTRAFILTRATION MEMBRANES BY ELECTRO-OSMOSIS

Kurt S. Spiegler, El Cerrito, Calif., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Continuation of Ser. No. 950,761, Oct. 12, 1978, abandoned. This application Aug. 7, 1979, Ser. No. 64,466

Int. Cl.³ B01D *13/00, 13/02;* C02B *1/82*

U.S. Cl. 210—636 **3 Claims**



1. A process for improving the efficiency of a reverse osmosis process for purification of saline water, said reverse osmosis process consisting essentially of applying to said saline water a pressure in excess of the osmotic pressure of the saline water, said saline water being separated from purified product water by a reverse osmosis membrane whereby pure water is caused to permeate through said membrane while salt molecules are retained by the membrane, comprising backwashing the membrane by application of an electric potential across the membrane to cause an electroosmotic backflow of water through the membrane.

4,231,866

RECOVERY OF ORGANIC AND AQUEOUS PHASES FROM SOLVENT EXTRACTION EMULSIONS

Kenneth W. Moser; Richard E. Siemens, both of Albany, and Stanley C. Rhoads, Corvallis, all of Oreg., assignors to The Unites States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Aug. 24, 1978, Ser. No. 936,465
Int. Cl.[2] B01D *15/00*
U.S. Cl. 210—660 4 Claims

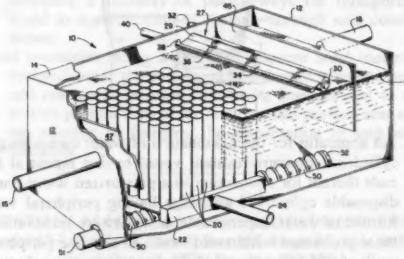
1. A process for recovery of organic solvent and aqueous phases from solvent extraction emulsions consisting essentially of the steps of (1) admixing the emulsion with diatomaceous earth and heating the mixture to a temperature of about 45° to 60° C. for a time sufficient for the diatomaceous earth to sorb foreign matter from the emulsion, (2) separating the diatomaceous earth, with sorbed foreign matter, from the organic solvent and aqueous phases and (3) separately recovering the organic solvent and aqueous phases.

4,231,867

METHOD AND APPARATUS FOR TREATING HETEROGENEOUS FLUID SYSTEMS

Eldon M. Sutphin, 306 Field Club Ridge Rd., Pittsburgh, Pa. 15238

Filed Aug. 31, 1979, Ser. No. 71,527
Int. Cl.[2] B01D *17/04*
U.S. Cl. 210—703 35 Claims



19. A method for separating constituents of differing densities dispersed in a fluid phase, the method comprising:

flowing gas bubbles into a liquid through a plurality of gas outlets positioned beneath the surface of a liquid to aerate the liquid;

moving the aerated liquid through a plurality of substantially vertical, open-ended conduit members positioned in mutally adjacent, close packed relationship in adjacent rows of several conduit members each with openings defined between the adjacent conduit members and immersed in the mixture;

separating at least a portion of constituents dispersed in at least one of the gas and liquid during flow through the conduit members;

forming a layer of separated, initially dispersed constituents; and

removing the layer of separated initial dispersed components from the liquid.

32. A method for separating constituents as set forth in claim 19 in which particles are dispersed within the liquid to provide greater surface area of solids within the liquid.

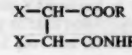
4,231,868

PROCESS FOR DEWATERING MINERAL AND COAL CONCENTRATES

Samuel S. Wang, Chesire, and Morris E. Lewellyn, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Jan. 5, 1979, Ser. No. 1,137
Int. Cl.[3] C02F *1/54*
U.S. Cl. 210—728 8 Claims

1. A process for dewatering mineral and coal concentrates which comprises mixing with an aqueous slurry of the mineral or coal concentrate a dewatering aid in an amount ranging from about 0.15 pound per ton to about 5.0 pounds per ton, said dewatering aid consisting essentially of an N-monosubstituted sulfosuccinamate of the general structure:



wherein R is a linear or branched aliphatic radical having four to fifteen carbon atoms, inclusive, R' is a linear or branched aliphatic radical having four to fifteen carbon atoms, inclusive, and X is hydrogen or a sulfonate salt, there being one X as hydrogen and one X as a sulfonate salt, and thereafter dewatering the treated slurry by filtration.

4,231,869

PERMANENT COBALT CATALYST FOR SULFITE OXYGEN SCAVENGING

Bob L. Carlberg, and Robert A. Hart, both of Ponca City, Okla., assignors to Conoco, Inc., Ponca City, Okla.

Continuation of Ser. No. 899,629, Apr. 24, 1978, abandoned.
This application Mar. 19, 1979, Ser. No. 21,418
Int. Cl.[3] C02F *1/72*
U.S. Cl. 210—763 6 Claims

1. In the recovery of hydrocarbons from petroliferous formations wherein water is injected into the formation through a wellbore, the method comprising reducing oxygen levels by mixing said water with a source of sulfite ion, said mixture then being passed over a catalyst bed containing water insoluble cation exchange resin having cobalt ions adsorbed thereon such that treated low oxygen content water contains substantially no cobalt ion.

4,231,870

PROCESS FOR REGENERATION OF A FILTER MEDIUM

Tron-Halvard Fladby, Asker, Norway, assignor to A/S Akers Mek. Verksted, Oslo, Norway

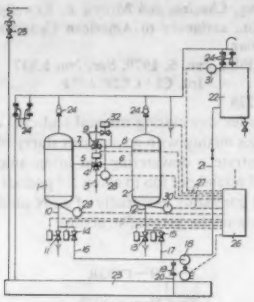
Filed Feb. 16, 1979, Ser. No. 12,738
Claims priority, application Norway, Feb. 20, 1978, 780583; Mar. 6, 1978, 780770
Int. Cl.[3] B01D *23/24*
U.S. Cl. 210—797 2 Claims

1. A method of cleaning and regenerating a filter which is used for filtering water but which becomes clogged with a layer of deposited microorganisms such as algae over a period of time, said method including the steps of

(a) draining away the water to be filtered from both the upstream side and the downstream side of the filter, the upstream and downstream sides relating to the direction of the flow of water to be filtered therethrough,

(b) directly contacting the filter with a previously formed sulfuric acid solution as the only active treatment chemical, said solution having a concentration of at least 65% sulfuric acid which is sufficient to break down and dehydrate the deposited layer, the acid solution being directed so as to first contact the upstream side of the filter, and

(c) washing the filter with purified water so as to flush away the residue of the microorganisms, the washing water



being directed so as to first contact the upstream side of the filter.

4,231,871

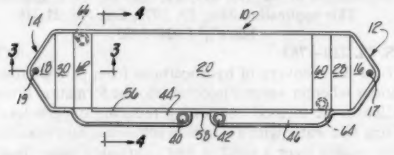
ARTIFICIAL KIDNEY AND METHOD FOR MAKING SAME

Bennie J. Lipps, Walnut Creek, Calif.; William P. Murphy, Jr., Miami, Fla., and Frank W. Mather, III, Lafayette, Calif., assignors to Cordis Dow Corp., Miami, Fla.

Division of Ser. No. 805,601, Jun. 10, 1977. This application Aug. 7, 1978, Ser. No. 931,229

Int. Cl.³ B01D *31/00;* **A61M** *1/03*

U.S. Cl. 210—87 **15 Claims**



1. An improved hollow fiber artificial kidney comprising in a one-piece integral construction a jacket member having

(1) spaced apart end portions interconnected by curvilinear portions, said curvilinear portions having portions integral with an exterior surface thereof and at least one of said exterior surface portions extending outwardly from said curvilinear portions for at least a part of the length thereof, said curvilinear portions and said end portions encompassing an inlet blood chamber, a dialysate chamber and an outlet blood chamber, each said chamber being fluid-tight and separated from each other,

(2) a first tubesheet adjacent one end of said curvilinear portions separating said inlet blood chamber from said dialysate chamber,

(3) a second tubesheet adjacent the other end of said curvilinear portions separating said dialysate chamber from said outlet blood chamber,

(4) a multiplicity of hollow fibers embedded in each said first and second tubesheet and extending therebetween, said hollow fibers being semipermeable and the ends of said fibers being open and terminating substantially in the plane of the outer end surface of each said tubesheet thereby providing communications between the interiors of said blood chambers through the passageways in said fibers, said hollow fibers between said tubesheets being within said dialysate chamber,

(5) blood supply means including an integral blood port in communication with said inlet blood chamber for supplying blood thereto,

(6) blood return means including an integral blood port in communication with said outlet blood chamber for removing blood therefrom, and

(7) dialysate means including integral inlet and outlet ports in communication with said dialysate chamber for supplying fresh dialysate to and removing spent dialysate from said dialysate chamber.

4,231,872

DEVICE FOR COMPLETE DESALINATION OF WATER

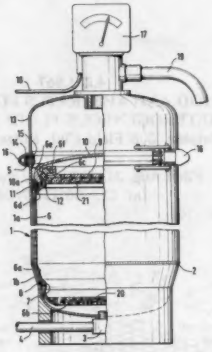
Wolfgang Keil, Kopernikusstr. 9, D-4044 Kaarst 1, Fed. Rep. of Germany

Filed Nov. 27, 1978, Ser. No. 964,073

Claims priority, application Fed. Rep. of Germany, Nov. 25, 1977, 27525811

Int. Cl.³ B01D *27/00, 35/02;* **B01J** *47/04*

U.S. Cl. 210—93 **11 Claims**



1. An apparatus for the desalination of water comprising:

a cylindrical pressure-resistant vessel having means at the ends thereof for connection to a pressurized water line;

a disposable cylindrical cartridge having peripheral walls formed of water impermeable, non-pressure resistant material positioned within said vessel so that the peripheral walls of said cartridge are in close proximity to or abutting the inside of said vessel,

a mixed bed of cationic and anionic exchange resins in said cartridge,

removable cover means at one end of said vessel,

water inlet and outlet means at the axial ends of said cartridge so that said cartridge is positioned in said vessel in such a way that water passing through said vessel will pass through said cartridge,

first sealing means near the end of said cartridge adjacent said water inlet means for establishing a water-pressure-tight seal between the wall of said cartridge and said vessel,

said cartridge including a clamping ring threadedly attached to the upper portion of said cartridge and an inwardly directed chamfer adjacent said clamp ring,

said first sealing means including a circumferential gasket abutting said chamfer and urged into contact with said vessel by means of said clamp ring

whereby the pressure of water passing through said cartridge is transferred through the non-pressure resistant walls of said cartridge to the pressure resistant walls of said vessel without damage to the walls of said cartridge.

4,231,873

UNDERWATER LIQUID CONTAINMENT SYSTEM

Michael P. Swigger, 580 Erbes Rd., Thousand Oaks, Calif. 91360

Filed Sep. 6, 1977, Ser. No. 830,581
Int. Cl.[2] B63B *35/00*; E02B *1/00*
U.S. Cl. 210—170 2 Claims

1. A liquid containment system comprising:

at least two elongated closed containers constructed of flexible fluid impermeable material for storing liquids;

said containers oriented in a generally upright manner proximate each other with each having a top portion and a bottom portion and being substantially entirely immersed within a surrounding body of water;

said top portions including an opening providing access to the interior thereof and being supported in an uppermost position by buoyant means connected thereto for communication to the atmosphere;

said buoyant means comprising a floating structure which supports a header assembly and conduit means in communication with each of said openings for transporting liquids into and out of said containers, said header assembly providing a plurality of passageways for transporting liquid in a predetermined manner through said conduit means;

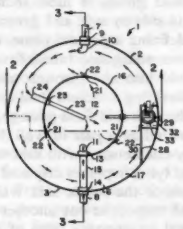
said containers being adapted to dispense solid materials accumulated in the bottom portion thereof wherein one of said containers includes connecting lines secured to the bottom portion thereof for drawing said portion near said top opening to facilitate the dispensation of said solid materials.

4,231,874

GYRATORY AEROBIC AERATION TREATMENT TANK

Raymond W. Heiligtag, Rte. 4, Box 180, Imperial, Mo. 63052

Filed Dec. 14, 1976, Ser. No. 750,395
Int. Cl.[3] B01F *3/04*; C02F *3/22*
U.S. Cl. 210—195.4 7 Claims



1. A self-contained waste treatment tank, which comprises:

a cylindrical outer shell, said shell having a bottom wall a cylindrical side wall, and a top wall, said outer shell delimiting a chamber;

a cylindrical baffle mounted in said chamber, said cylindrical baffle dividing said chamber into a first chamber part and a second chamber part, said cylindrical baffle having a lower end attached along the bottom wall of said outer shell and an upper end extending above a liquid level in said chamber, said cylindrical baffle having at least one opening permitting communication between said first and said second chamber parts along the lower end of said baffle;

sewage inlet means communicating with said first chamber part;

inlet means in said cylindrical baffle communicating with said first chamber part and said second chamber part, said inlet means being positioned below the liquid level in said chamber;

outlet means communicating with said second chamber part and a point external of said outer shell; and

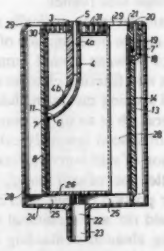
means for generating a horizontal circulatory flow pattern in said first chamber, said flow pattern generating means comprising a pump submerged in sad first chamber part, said pump having an inlet positioned toward the bottom of said first chamber part and an outlet, and linkage means connected to the outlet of said pump, said linkage means including a first pipe operatively connected to said pump, connection means connected to a second end of said first pipe, and a second pipe operatively connected to said connection means, said first pipe having a first internal diameter, said second pipe having a second internal diameter, said second internal diameter being larger than the internal diameter of said first pipe, said connection means including an expanding part for expanding the diameter of said linkage means from said first diameter to said second diameter, said second pipe having an outlet in and below the fluid level in said first chamber part, said horizontal circulatory flow pattern generating means creating a flow pattern in said first chamber part which directs fluid from said first chamber part to said second chamber part through said inlet means and which simultaneously draws fluid from said second chamber part to said first chamber part along the opening in the lower end of said cylindrical baffle.

4,231,875

DIFFUSION APPARATUS UTILIZING TUBULAR SEMI-PERMEABLE MEMBRANE

Per-Olov A. V. Carlsson, Sösdala, and Kaj O. Stenberg, Staffanstorp, both of Sweden, assignors to Gambro AB, Sweden

Filed May 3, 1978, Ser. No. 902,353
Claims priority, application Sweden, May 13, 1977, 7705656
Int. Cl.[3] B01D *31/00*
U.S. Cl. 210—232 26 Claims



1. Diffusion apparatus comprising an outer casing, a one-piece inner core disposed within said outer casing defining a diffusion space between said one-piece inner core and said outer casing, so that a tubular semi-permeable membrane having a first end and a second end and a spacing material can be wound about said one-piece inner core within said diffusion space, said one-piece inner core including a first end, a second end, and an aperture on the surface of said one-piece inner core facing said outer casing, said one-piece inner core further

including integral inner core first fluid channel means communicating between said aperture on said surface of said one-piece inner core and said first end of said one-piece inner core whereby said one-piece inner core provides for fluid communication between said first end of said inner core and said aperture on said surface of said inner core for communication with a first fluid within the interior of said tubular semi-permeable membrane at the first end thereof, second fluid directing means communicating with a second fluid within said diffusion space for contacting the outer surface of said tubular semi-permeable membrane, and third fluid directing means communicating with said first fluid within the interior of said tubular semi-permeable membrane at the second end thereof.

4,231,876

REUSABLE COFFEE FILTER

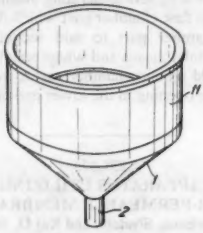
Anton Zimmermann, Ennetbürgen, and Albert Greutert, Sachseln, both of Switzerland, assignors to MAXS Aktiengesellschaft, Sachseln, Switzerland

Filed Feb. 15, 1979, Ser. No. 12,502

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1978, 2808295

Int. Cl.[2] B01D *23/28;* B65B *39/00;* B67C *11/00*

U.S. Cl. 210—232 **3 Claims**



1. A reusable coffee filter assembly for use in providing a filtrate of liquid such as coffee, said assembly comprising:

a cone-shaped funnel and a reusable filtering element positionable within said funnel;

coacting spacing means to critically space an inner surface of said funnel and an outer surface of said filtering element at a distance of between from 0.2 mm and 1.5 mm from each other when said filtering element is positioned within said funnel, said spacing means including an inwardly extending peripheral rib at an upper inner portion of said funnel, a plurality of spaced inwardly extending protrusions on a lower portion of said inner surface of said funnel adjacent a lower outlet port of said funnel, and a peripheral groove at an upper portion of said filtering element, said groove engaging said rib, and a minimal outer surface portion of said filtering element contacting said spaced protrusions to maintain said critical spacing between said inner surface of said funnel and said outer surface of said filtering element to provide a substantial filtering area in which a continuous layer of the filtrate is formed on said inner surface of said funnel and passes through said outlet port as a continuous column of liquid; and

a throttling means in said outlet port, said throttling means being so dimensioned and spaced in said outlet port to control the flow of the filtrate to maintain said continuous layer of filtrate whereby a rapid filtering speed is attained.

4,231,877

BLOOD DIALYZER

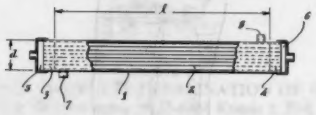
Kazuhisa Yamauchi; Taku Tanaka; Syuji Kawai, and Hirokuni Tanii, all of Kurashiki, Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed May 30, 1978, Ser. No. 910,462

Claims priority, application Japan, Jun. 1, 1977, 52-71838[U]

Int. Cl.[3] B01D *31/00*

U.S. Cl. 210—321 B **4 Claims**



1. An improved blood dialyzing apparatus comprising the combination of a cylindrical housing and at least one bundle of semi-permeable hollow filaments positioned in said housing, a blood inlet and outlet in respective ends of said housing, and a dialysate inlet and outlet in the side wall of said housing, the improvement wherein:

said housing has an inside diameter in the range of 20 to 50 mm, and an effective length in the range of 200 to 350 mm, the ratio of the effective length of said housing to the inside diameter thereof being within the range of 7 to 10.

4,231,878

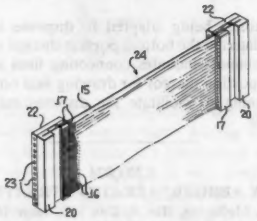
CAPILLARY MASS TRANSFER DEVICE

William G. Esmond, 8000 Country Club Rd., Havre de Grace, Md. 21078

Filed Jul. 16, 1975, Ser. No. 596,501

Int. Cl.[3] B01D *31/00*

U.S. Cl. 210—321 B **12 Claims**



1. A capillary mass transfer device comprising a group of capillary tubes, said group of tubes including a plurality of tubes arrranged in side by side and generally stacked relation with said tubes defining a general plane, means for defining a fluid passage surrounding said tubes, first flow means for directing a first fluid into and through said tubes, and second flow means for directing a second fluid through said first flow means into and through said fluid passage, said means defining a fluid passage including a pair of wall defining members extending generally coextensive with said tubes in the direction of tube length and lying in planes disposed generally parallel to said general plane of the tubes, said wall defining members being spaced with respect to one another transversely of said tubes and disposed on opposite sides of the general plane of said tubes with said tubes being disposed therebetween, said wall defining members further having end portions in the direction of tube length disposed beyond each end of said tubes, means fixedly securing end portions of said tubes relative to said wall defining members and in sealed relation to said wall defining members, and said second flow means including flow passage defining members positioned between said end portions of said wall defining members and extending gener-

ally parallel to the general plane of said tubes, each flow passage defining member having inner and outer end portions with each inner end portion being sealed relative to exteriors of said tube end portions and forming part of said means defining a fluid passage, said flow passage defining members having flow passages therethrough opening into said fluid passage.

4,231,879

APPARATUS FOR SELECTIVE SEPARATION OF MATTER THROUGH SEMI-PERMEABLE MEMBRANES

Kurt Spranger, Ammerbuch-Entringen, Fed. Rep. of Germany, assignor to Gambro Dialysatoren GmbH & Co. KG, Fed. Rep. of Germany

Filed Oct. 13, 1978, Ser. No. 951,314
Claims priority, application Sweden, Oct. 17, 1977, 7711630
Int. Cl.³ B01D *31/00*
U.S. Cl. 210—321 B **20 Claims**

1. Apparatus for selectively separating matter between a first fluid and a second fluid through semi-permeable membranes, said apparatus comprising:

a plurality of elongated frame assemblies each of which has a first end and a second end and each of which defines an elongated contact chamber for said second fluid;

a plurality of tubular semi-permeable membranes for said first fluid for each of said frame assemblies, said pluralities of tubular membranes being disposed in said contact chambers of said frame assemblies;

said frame assemblies being stacked with said elongated contact chambers being in side by side relationship and with said first ends of said frame assemblies arranged at a first end of said stacked frame assemblies and said second ends of said frame assemblies arranged at a second end of said stacked frame assemblies;

fluid communication means for said stacked frame assemblies for providing fluid communication between said contact chambers of said frame assemblies through which said second fluid is adapted to be conducted;

a pair of cover plates for said stacked frame assemblies, said cover plates being disposed on opposite sides of said stacked frame assemblies and each having a first end arranged adjacent said first end of said stacked frame assemblies and a second end arranged adjacent said second end of said stacked frame assemblies;

sealing means for sealing said tubular semi-permeable membranes from said contact chambers so that there is no contact between said first fluid and said second fluid;

a first end fitting encompassing the outer periphery of said stacked frame assemblies at said first end of said stacked frame assemblies and a second end fitting encompassing the outer periphery of said stacked frame assemblies at said second end of said stacked frame assemblies, at least said first end fitting including means for clamping said stacked frame assemblies between said pair of cover plates to hold said stacked frame assemblies together;

inlet means for said first fluid for introducing said first fluid into said tubular semi-permeable membranes and outlet means for said first fluid for withdrawing said first fluid from said tubular semi-permeable membranes;

inlet means for said second fluid for introducing said second fluid into at least one of said contact chambers; and

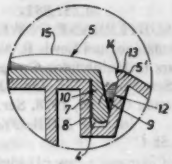
outlet means for said second fluid for withdrawing said second fluid from said contact chambers whereby said second fluid is conducted substantially throughout said contact chambers of said stacked frame assemblies around said tubular semi-permeable membranes supported therein to selectively separate matter between said first and second fluids.

4,231,880

ASSEMBLY FOR THE CLOSURE OF THE END OF A FLATTENED TUBE

Per-Olov A. V. Carlsson, Södsala, and Kaj O. Stenberg, Staffanstorp, both of Sweden, assignors to Gambro AB, Sweden

Filed Nov. 17, 1978, Ser. No. 961,517
Claims priority, application Sweden, Nov. 18, 1977, 7713020
Int. Cl.³ B01D *13/00*
U.S. Cl. 210—321 B **10 Claims**



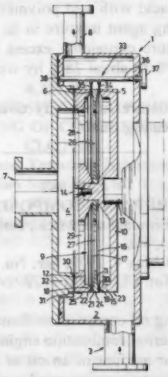
1. A clamping assembly for clamping and sealing the end of a flattened tube, comprising a groove for receiving an end of a flattened tube, and a clamping member including a beaded portion for clamping and sealing the end of a flattened tube when said clamping member is in a clamping position within said groove and the end of the flattened tube is properly disposed in said groove, said groove comprising a first groove surface and a second groove surface disposed at an oblique angle relative to said first groove surface, said second groove surface including a clamping portion, and said clamping member including a locking portion adapted to mate with said clamping portion of said second groove surface when said clamping member is in its said clamping position within said groove whereby said beaded portion is held in its sealing position relative to the end of a flattened tube properly disposed within said groove.

4,231,881

PULP SCREEN DEVICE

Gosta Ingemarsson, Säffle, Sweden, assignor to Eur-Control Källe AB, Sweden

Filed Dec. 29, 1978, Ser. No. 383
Claims priority, application Sweden, Dec. 30, 1977, 7714960
Int. Cl.² B01D *33/02*
U.S. Cl. 210—396 **10 Claims**



1. A screen device for separating undesirable impurities from

a pulp suspension, said device is provided with at least one continuous circular screen slot provided between a first chamber into which suspension to be screened is conducted through an inject-inlet and from which undesirable material is passed away through a reject-outlet, and a second chamber from which screened suspension is forwarded through an accept-outlet, characterized in that the screen slot is formed by two walls stationary in relation to each other and that a cleaning device bears against the screen slot, said cleaning device and slot being movable in relation to each other for continuous cleaning of the screen slot.

4,231,882

TREATING SUBTERRANEAN WELL FORMATIONS

Eugene A. Elphingstone, and Lewis R. Norman, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Continuation of Ser. No. 871,735, Jan. 23, 1978, abandoned. This application Oct. 20, 1978, Ser. No. 953,284

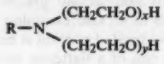
Int. Cl.³ E21B *43/27*

U.S. Cl. 252—8.55 C **35 Claims**

1. A method of forming a low pH highly viscous thixotropic fluid for use in treating a subterranean well formation comprising the steps of:

combining an aqueous solution of acid other than hydrofluoric acid with an aqueous alkali metal silicate solution having a pH of greater than about 11 in an amount sufficient to lower the pH of the resulting mixture to the level in the range of from about 7.5 to about 8.5 thereby forming a polymerized alkali metal silicate gel;

combining a gelling agent with said polymerized alkali metal silicate gel, said gelling agent consisting of a solution of a water soluble organic solvent and a mixture of ethoxylated fatty amines having the general formula:



wherein:

R is selected from saturated and unsaturated aliphatic groups having in the range or from about 8 to about 22 carbon atoms, and

x and y each have a value in the range of from 0 to about 10 but both x and y are not 0; and

said ethoxylated fatty amine is present in said gelling agent in an amount in the range of from about 10% to about 80% by weight of said gelling agent;

combining additional aqueous solution of acid other than hydrofluoric acid with said polymerized alkali metal silicate gel-gelling agent mixture in an amount sufficient to obtain a mixture containing excess acid in the range of from about 1% to about 28% by weight of said mixture; and

shearing said mixture to thereby obtain a highly viscous thixotropic treating fluid.

4,231,883

LUBRICANT COMPOSITION

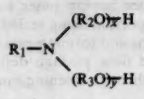
Robert E. Malec, Birmingham, Mich., assignor to Ethyl Corporation, Richmond, Va.

Filed May 4, 1979, Ser. No. 36,073

Int. Cl.³ C10M *1/32, 1/40*

U.S. Cl. 252—33.4 **7 Claims**

1. In a lubricating oil composition formulated for use in the crankcase of an internal combustion engine, said lubricating oil comprising a major amount of an oil of lubricating viscosity suitable for use in an engine crankcase, the improvement wherein said composition contains a minor friction-reducing amount of an oil soluble additive having the formula



wherein R_1 is an aliphatic hydrocarbon group containing about 12–36 carbon atoms, R_2 and R_3 are divalent hydrocarbon radicals containing 2–4 carbon atoms and x and y is 2 to about 6, said improvement resulting in an increase in fuel economy.

4,231,884

WATER RETARDANT INSULATION COMPOSITION COMPRISING TREATED LOW DENSITY GRANULAR MINERAL MATERIAL AND FINELY DIVIDED LIMESTONE OR SIMILAR CARBONATE OR SILICATE MINERAL PARTICLES AND METHOD FOR USING SAME

Carl B. Dorius, Salt Lake City, Utah, assignor to American Gilsonite Company, Salt Lake City, Utah

Continuation-in-part of Ser. No. 815,581, Jul. 14, 1977, abandoned. This application Jan. 16, 1979, Ser. No. 3,791

Int. Cl.³ C04B *43/08, 43/00*; F16L *59/02, 59/04*

U.S. Cl. 252—62 **62 Claims**

1. A composition for thermally insulating and protecting structures against corrosion comprising a mixture of about 80% to about 20% by volume limestone particles having a particle size smaller than about 150 mesh Tyler standard sieve size, said particles being coated with a water repellant material; and about 20% to about 80% by volume of a low density granular mineral material having a particle size larger than the limestone particles, each granule threof having vesicular pores such that said granular mineral material has a bulk density from about 3 to about 65 pounds per cubic foot, said granular mineral material being coated with a water repellant material selected from the group consisting of silicones, asphalts, waxes and gilsonite.

28. A composition for thermally insulating and protecting structures against corrosion comprising a mixture of about 80% to about 20% by volume mineral particles not having vesicular pores, said mineral particles being selected from the group consisting of silicate minerals and carbonate minerals, said particles having a particle size smaller than about 150 mesh Tyler standard sieve size, said particles being coated with a water repellant material; and about 20% to about 80% by volume of a low density granular mineral material having a particle size larger than the mineral particles, each granule thereof having vesicular pores such that said granular mineral material has a bulk density from about 3 to about 65 pounds per cubic foot, said granular mineral material being coated with a water repellant material selected from the group consisting of silicones, asphalts, waxes and gilsonite.

4,231,885

THERMAL ENERGY STORAGE COMPOSITION COMPRISING PEAT MOSS

Philip G. Rueffel, Prince Albert, Canada, assignor to Saskatchewan Minerals, Chaplin, Canada

Filed Jul. 12, 1979, Ser. No. 56,837

Int. Cl.² C09K *5/06*

U.S. Cl. 252—70 **16 Claims**

1. A thermal energy storage composition which utilizes latent heat of phase change to store thermal energy comprising:

an incongruently melting salt hydrate, capable of storing thermal energy as latent heat of phase change, and a nucleating agent, both being trapped in a network of peat moss.

4,231,886

ESTER SOLUTIONS OF COMPLEX SALTS

Robert C. Carlson, Hudson, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 29, 1979, Ser. No. 7,667
Int. Cl.[3] B01J *31/02*
U.S. Cl. 252—117 7 Claims

1. A composition consisting essentially of a complex salt dissolved in a liquid organic ester which is free of substituents which are reactive with cationically polymerizable groups, wherein said complex salt is present in an amount of at least 10% by weight of said composition, and wherein said complex salt is selected from diorganoiodonium complex salts and triorganosulfonium complex salts of a type capable of initiating photopolymerization of cationically polymerizable materials.

4,231,887

ZEOLITE AGGLOMERATES FOR DETERGENT FORMULATIONS

Arthur F. Denny, Katonah, and John D. Sherman, Chappaqua, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Jun. 26, 1979, Ser. No. 52,190
Int. Cl.[2] B01J *1/04;* C11D *3/12, 3/20, 17/06*
U.S. Cl. 252—174.19 5 Claims

1. Zeolite-containing agglomerate particles suitable for incorporation into detergent formulations which comprise (a) crystals of a three-dimensional zeolite of the molecular sieve type containing ion-exchangeable alkali metal cations, said zeolite being contained in a combined matrix of an intimate mixture of (b) at least one or a mixture of two or more ethoxylated alcohols having the formula $R—O—(CH_2—CH_2—O)_nH$ wherein "R" is a primary or secondary alkyl group containing from 9 to 18 carbon atoms and "n" is a whole number of from 3 to 12 inclusive, said ethoxylated alcohol being present in an amount of 15 to 50 parts by weight per 100 parts by weight of zeolite crystals (hydrated), and (c) sodium citrate, as the dihydrate, in an amount of 8 to 25 parts by weight per 100 parts by weight of zeolite.

4,231,888

COMPOSITION USED FOR EXTRACTING COPPER FROM AQUEOUS COPPER SALTS

Raymond F. Dalton, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 756,067, Jan. 3, 1977, Pat. No. 4,142,952. This application Dec. 1, 1978, Ser. No. 965,498
Claims priority, application United Kingdom, Jan. 30, 1976, 3788/76; Jun. 15, 1976, 24722/76; Oct. 21, 1976, 43711/76
Int. Cl.[2] C22B *15/08, 3/00*
U.S. Cl. 252—182 6 Claims

1. A composition for use in extracting copper values from aqueous solutions of copper salts, said composition comprising (1) o-hydroxyaryloximes selected from the group consisting of a mixture of 5-nonylsalicylaldoximes and a mixture of 5-heptylsalicylaldoximes and (2) a mixture of p-nonylphenols, the amount of (2) being in the range of 0.1 to 20 times the weight of (1), said composition being capable of permitting greater overall copper recovery in a process involving contacting the aqueous solution of copper salts with a solution of said composition in a water-immiscible organic solvent, separating from the aqueous phase the solvent phase containing copper in the form of a complex with the indicated oxime mixture, contacting the solvent phase with an aqueous mineral acid, and separating the solvent phase from the aqueous phase containing copper in the form of a salt with the mineral acid.

4,231,889

DIVALENT SILVER OXIDE FOR USE IN PRIMARY CELL AND MANUFACTURING METHOD THEREOF

Kaoru Murakami, Hirakata; Mitsugu Okahisa, Kyoto; Tomohiko Arita, Hirakata, and Hiroshi Kumano, Daito, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Continuation-in-part of Ser. No. 935,314, Aug. 21, 1978, abandoned. This application Oct. 11, 1979, Ser. No. 83,937
Claims priority, application Japan, Aug. 19, 1977, 52-99666; Feb. 24, 1978, 53-21393; Feb. 24, 1978, 53-21394
Int. Cl.[3] C01G *5/00;* H01M *4/54*
U.S. Cl. 252—182.1 15 Claims

1. A method for manufacturing a stable silver oxide for use in a primary cell which consists essentially of the steps of:

(a) reacting in aqueous solution at a temperature of 0° to 60° C. at least one member selected from the group consisting of silver salts and silver oxide (Ag_2O), persulfate and alkaline metal hydroxide to produce silver-II oxide, said persulfate being used in amount 1.0 to 1.85 times the theoretical amount thereof, with its concentration in aqueous solution being in the range from 0.04 to 0.72 mol/l, and said alkaline metal hydroxide being used in amount 1.05 to 6.0 times the theoretical amount thereof, with its concentration in aqueous solution being in the range from 0.3 to 4.8 mol/l and

(b) water washing and drying said divalent silver oxide thus produced.

10. The method of manufacturing a stable silver-II oxide as claimed in claim 4, wherein there is added to the thus produced silver-II oxide, at least one cadmium compound selected from the group consisting of cadmium salts and cadmium oxide in an amount of 0.05 to 20 parts by weight based on the amount of cadmium, per 100 parts by weight of silver.

4,231,890

BLEACHING COMPOSITION CAUSING NO COLOR CHANGE OR FADING OF COLORED AND FIGURED CLOTHS

Kouichi Yagi, Tokyo, and Yunosuke Nakagawa, Soka, both of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Nov. 2, 1978, Ser. No. 957,082
Claims priority, application Japan, Nov. 25, 1977, 52-141351
Int. Cl.[3] C11D *7/54, 3/395;* D06L *3/02*
U.S. Cl. 252—186 9 Claims

1. A bleaching composition which does not cause color change or fading of fabrics, consisting essentially of 50 to 98 weight % of peroxide which releases oxygen in an aqueous solution, 1 to 49 weight % of nitrilotriacetic acid, or water-soluble salt thereof, or mixture thereof, and 1 to 49 weight % of water softener capable of removing or masking calcium ions and magnesium ions contained in hard water to convert the hard water to soft water.

4,231,891

SOLID COMPOSITIONS FOR GENERATION OF GASES CONTAINING A HIGH PERCENTAGE OF HYDROGEN OR ITS ISOTOPES

Werner F. Beckert, Las Vegas, Nev.; William H. Barber, Brandywine, Md., and Ottmar H. Dengel, Front Royal, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 16, 1978, Ser. No. 916,423
Int. Cl.[3] C01B *1/07*
U.S. Cl. 252—188 12 Claims

1. Solid compositions for generating gases containing a high percentage of hydrogen or hydrogen isotopes comprising an intimate mixture of at least one metal powder selected from the group consisting of magnesium, aluminum, vanadium, zirconium, and titanium and at least one salt selected from the group consisting of an ammonium salt of the formula $(NH_4)_nX$ and a hydrazinium salt of the formula $(N_2H_6)_nX$ wherein H stands for hydrogen and its isotopes, X is an inorganic acid group and n is the valency of said inorganic acid group and wherein said compounds are present in about stoichiometric amounts or are present in amounts such that there is a stoichiometric excess of one of the components.

4,231,892

MANGANESE DOPED ZINC SILICATE LUMINESCENT PHOSPHORS WITH III-V OXIDE SUBSTITUTIONS

Ifay F. Chang, Chappaqua, and Merrill W. Shafer, Yorktown Heights, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 5, 1979, Ser. No. 17,521
Int. Cl.[3] C09K *11/44*
U.S. Cl. 252—301.6 F 5 Claims

1. Luminescent composition of a solid solution comprising $Zn_{2-y}Mn_ySi_{1-2x}Al_xP_xO_4$ having a willemite crystal structure wherein

$0<y\leqq 0.25$ and $0<x<0.5$,

wherein x is an amount sufficient to effect a luminescence efficiency that is greater than said composition absent Al and P, and

wherein y is an amount sufficient to effect an emission peaked near 5230 Å.

4,231,893

PROCESS FOR PREPARING AQUEOUS DISPERSION OF CERIA AND RESULTING PRODUCT

James L. Woodhead, Didcot, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Oct. 25, 1978, Ser. No. 954,658
Claims priority, application United Kingdom, Nov. 1, 1977, 45471/77; May 25, 1978, 22835/78
Int. Cl.[3] B01J *13/00*
U.S. Cl. 252—313 R 12 Claims

1. A process for the preparation of an aqueous dispersion of ceria comprising forming a slurry of cerium IV hydroxide with water and an acid, the acid being capable of causing deaggregation of aggregated crystallites in the cerium IV hydroxide, heating the slurry for such a time and at such a temperature that the pH reaches a steady value, the quantity of acid in the slurry being such that the said steady value of pH is below 5.4, thereby to produce a conditioned slurry, separating liquid containing unreacted acid from said conditioned slurry to provide a slurry residue and admixing sufficient water with the resulting slurry residue to produce a sol of ceria.

12. An aqueous dispersion of ceria whenever prepared by a process as claimed in claim 1.

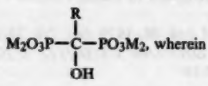
4,231,894

STABILIZED ALKALI METAL BISULFITE OR SULFITE-CATALYZED SOLUTIONS

Walter M. Lavin, Horsham; James I. McFarlane, Warminster, and Dennis L. Rose, Fairless Hills, all of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Continuation-in-part of Ser. No. 929,157, Jul. 31, 1978, abandoned, which is a division of Ser. No. 807,949, Jun. 20, 1977, which is a continuation of Ser. No. 724,442, Sep. 20, 1976, abandoned. This application Jan. 17, 1980, Ser. No. 112,981
Int. Cl.[3] C23F *11/18*
U.S. Cl. 252—389 A 15 Claims

1. A method for stabilizing during storage an aqueous solution of an alkali metal sulfite or bisulfite containing a water-soluble cobalt catalyst without affecting the catalytic effect of the cobalt catalyst, which solution with an increase of pH will experience the precipitation of said cobalt as its sulfite salt, said method consisting essentially of incorporating in said solution a stabilizing amount of a compound having the structural formula:



$M_2O_3P-C(R)(OH)-PO_3M_2$, wherein

R is a lower alkyl of from 1 to 3 carbon atoms and wherein M is selected from the group of hydrogen, sodium, potassium and ammonium.

4,231,895

SYNERGISTIC HEAT STABILIZER COMPOSITIONS CONTAINING AN ANTIMONY OR A BISMUTH COMPOUND

Robert D. Dworkin, Old Bridge, N.J., assignor to M & T Chemicals Inc., Woodbridge, N.J.

Filed Jan. 2, 1979, Ser. No. 72
Int. Cl.[3] C09K *15/32, 15/14, 15/08*
U.S. Cl. 252—400 A 18 Claims

1. In an improved composition for imparting heat stability to halogen-containing polymers of ethylenically unsaturated hydrocarbons wherein the heat stabilizer exhibits the general formula MX_3, MX_nY_{3-n}, RM=S and R_nMX_{3-n} wherein M is antimony or bismuth, R is hydrocarbyl, n is 1 or 2 and X and Y individually represent the residue obtained by removing (1) the hydrogen atom from a carboxy (—COOH) group of a mono- or polyfunctional carboxylic acid or mercaptocarboxylic acid or (2) the hydrogen atom from the sulfur atom of a mercaptan, mercaptoalkanol, mercaptocarboxylic acid or an ester of a mercaptocarboxylic acid or mercaptoalkanol, the improvement which resides in the presence in said composition of a synergist containing at least one residue obtained by removing one or both hydrogens from the hydroxyl groups of a o-dihydric phenol, said residue being bonded through one or both oxygen atoms to an element selected from the group consisting of boron, phosphorus, silicon, antimony, tin and zinc.

4,231,896

ORGANOMAGNESIUM COMPLEXES

Dennis B. Malpass, LaPorte, Tex., assignor to Texas Alkyls, Inc., Deer Park, Tex.

Continuation of Ser. No. 697,085, Jun. 16, 1976, abandoned, which is a continuation of Ser. No. 570,685, Apr. 23, 1975, abandoned. This application Jun. 12, 1978, Ser. No. 915,083
Int. Cl.[3] C08F *4/50*
U.S. Cl. 252—431 R 4 Claims

1. A hydrocarbon soluble organomagnesium complex having the formula

$(R'_2Mg)_m.(RM)_n$

wherein RM is triethyl boron, R' is n-butyl and m and n are numbers such that the ratio of m/n is from 1 to 20.

2. A hydrocarbon soluble organomagnesium complex having the formula

$$(R'_2Mg)_m\text{-}(RM)_n$$

wherein RM is tri-isobutyl boron, R' is n-butyl and m and n are numbers such that the ratio of m/n is from 1 to 20.

4,231,897

ATTENUATED SUPERACTIVE MULTIMETALLIC CATALYTIC COMPOSITE

George J. Antos, Bartlett, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 947,906, Oct. 2, 1978, which is a continuation-in-part of Ser. No. 833,332, Sep. 14, 1977, Pat. No. 4,165,276. This application May 4, 1979, Ser. No. 36,120

The portion of the term of this patent subsequent to Jun. 12, 1996, has been disclaimed.

Int. Cl.³ B01J *27/08, 27/10, 23/36*

U.S. Cl. 252—441 **18 Claims**

1. A catalytic composite comprising a combination of a catalytically effective amount of a pyrolyzed rhenium carbonyl component with a porous carrier material containing a uniform dispersion of catalytically effective amounts of a platinum group component, which is maintained in the elemental metallic state, and of a cadmium component.

6. A catalytic composite as defined in claim 1 wherein the porous carrier material contains a catalytically effective amount of a halogen component.

4,231,898

REFORMING WITH MULTIMETALLIC CATALYSTS

Charles H. Mauldin, and William C. Baird, Jr., both of Baton Rouge, La., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Jun. 29, 1979, Ser. No. 53,374

Int. Cl.³ C11D *7/02;* **C10G** *35/06*

U.S. Cl. 252—441 **6 Claims**

1. A process for the preparation of copper-containing catalysts which comprises

forming an inorganic oxide support,

impregnating said support by contact thereof with a copper-containing halogen acid solution,

neutralizing said halogen acid treated, copper-containing support, and then

impregnating said copper-containing support by contact thereof with a solution containing one or more hydrogenation-dehydrogenation components.

4,231,899

METHOD OF PRODUCING A STEAM STABLE ALUMINOSILICATE ZEOLITE CATALYST

Nai Y. Chen, Titusville; Joseph N. Miale, Lawrenceville, both of N.J., and William J. Reagan, Yardley, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 801,881, May 31, 1977, abandoned. This application Jan. 22, 1979, Ser. No. 5,279

Int. Cl.³ B01J *29/04, 29/28*

U.S. Cl. 252—455 Z **16 Claims**

1. A method for stabilizing a crystalline alumino-silicate zeolite catalyst against steam deactivation wherein said zeolite is characterized by a silica/alumina ratio of at least about 12 and a constraint index within the approximate range of 1 to 12 and when said zeolite is an organozeolite further characterized by having at least about 50% of its active cationic sites occupied by organic cations comprising intimately admixing said zeolite and a sufficient amount of a suitable charring agent and thereafter subjecting said zeolite catalyst to calcination at an elevated temperature below about 1100° F. in a closed system having a limited amount of oxygen thereby converting a portion of said organic cations and/or charring agent to carbonaceous material of which at least about 1.5–15 wt. % is deposited and retained within the pores of said zeolite catalyst after said calcination.

6. The process of claim 1 wherein the catalyst is selected from the group consisting of ZSM-5, ZSM-11, ZSM-12, ZSM-35 and ZSM-38.

11. The process of claim 1 wherein the charring agents are selected from the group consisting of unsaturated hydrocarbons, dicyclic aromatics, picoline N-oxide and tripropyl N-oxide.

4,231,900

METHOD FOR FORMING ACTIVATED ALUMINA COATING ON REFRACTORY ARTICLE AND ARTICLE THEREBY PRODUCED

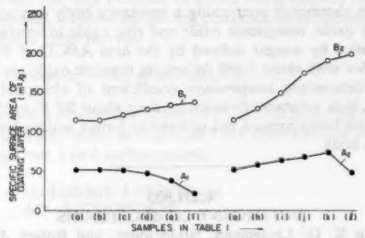
Tadanari Kato; Tadashi Ikemi, and Takatoshi Sagawa, all of Yokohama, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Continuation-in-part of Ser. No. 684,243, May 7, 1976, abandoned, which is a continuation of Ser. No. 466,074, May 1, 1974, abandoned. This application Mar. 31, 1978, Ser. No. 892,035

Claims priority, application Japan, May 24, 1973, 48-58127

Int. Cl.² B01J *23/62, 23/82*

U.S. Cl. 252—466 PT **16 Claims**



1. A method for forming a high surface area coating on the surface of a monolithic catalyst carrier, said method comprising the steps of:

preparing a mixture containing not more than 20 parts by weight of alumina sol and one part by weight of activated alumina, said alumina sol containing 3 to 15 Wt % of alumina, said activated alumina containing not less than 60 Wt % of delta-alumina;

coating said mixture onto the surface of the catalyst carrier;

drying the coated catalyst carrier; and

firing the coated catalyst carrier at a temperature in the range of 150° to 850° C. for a time in the range of from 0.5 to 20 hours to form the high surface area coating on the surface of the catalyst carrier.

15. A catalyst for purifying exhaust gases from automobile engines, comprising a monolithic carrier, a high surface area coating formed on the surface of said monolithic carrier, said high surface area coating being formed by firstly preparing a mixture containing not more than 20 parts by weight of alumina sol and one part by weight of activated alumina, said alumina sol containing 3 to 15 Wt % of alumina, said activated alumina containing not less than 60 Wt % of delta-alumina, secondary coating said mixture onto the surface of said monolithic carrier, thirdly drying the coated monolithic carrier, fourthly firing the coated catalyst carrier at a temperature in the range of 150° to 850° C. for a time in the range of from 0.5 to 20 hours, and lastly immersing the fired coated monolithic carrier in a solution containing a noble metal.

4,231,901
ELECTRICALLY CONDUCTIVE FOAM AND METHOD OF PREPARATION AND USE

George R. Berbeco, West Newton, Mass., assignor to Charleswater Products, Inc., Needham, Mass.

Continuation-in-part of Ser. No. 824,051, Aug. 12, 1977, Pat. No. 4,150,418. This application Jun. 23, 1978, Ser. No. 918,411
Int. Cl.[3] H01B *1/06*; H01C *1/06*
U.S. Cl. 252—511 27 Claims

1. An electrically conductive foam adapted for use with electronic components sensitive to static charges, which foam consists essentially of:

an open-cell polymeric foam uniformly impregnated with electrically conductive particulate material in an amount of from about 2% to 40% by weight of the impregnated foam and sufficient to provide for a surface resistance of the foam of less than about 30,000 ohms per square inch, the particulate material having a particle size of less than 40 millimicrons, and from about 1% to 60% by weight of the impregnated foam of a film-forming polymeric-binding material securing the conductive particulate material to the foam.

4,231,902
THERMISTOR WITH MORE STABLE BETA

Ruey J. Yu, Flint, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 23, 1978, Ser. No. 935,874
Int. Cl.[2] H01B *1/06*
U.S. Cl. 252—519 3 Claims

1. A thermistor comprising a resistance body composed of cobalt oxide, manganese oxide and zinc oxide in substantially the ratios by weight defined by the area ABCD of FIG. 1, together with about 3–6% by weight titanium oxide providing a predetermined temperature coefficient of electrical resistance, beta, substantially constant from about 50° F. to 350° F., the same being pressed and sintered to form a unitary homogeneous body.

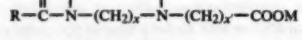
4,231,903
DETERGENT COMPOSITIONS

Martin K. O. Lindemann, Bridgewater, and Robert J. Verdicchio, Succasunna, both of N.J., assignors to Johnson & Johnson, New Brunswick, N.J.

Filed Nov. 30, 1978, Ser. No. 965,460
Int. Cl.[2] C11D *3/36*, *7/36*
U.S. Cl. 252—545 10 Claims

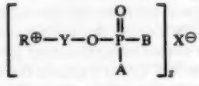
1. A low irritating detergent and cleansing composition wherein the active ingredients consist essentially of

(a) from about 1 to 20% by weight of the total composition of an amphoteric surfactant of the formula



wherein R is an alkyl group containing from about 8 to 18 carbon atoms and mixtures thereof; R′ is hydroxy alkyl containing from 2 to 4 carbon atoms or $CH_2—O—CH_2—COOM$; x and x′ are integers from 1 to 5; and M is hydrogen or an alkali metal; and

(b) from about 1 to 20% by weight of the total composition of a compound selected from the group consisting of a phosphobetaine of the formula



wherein

A is selected from O^-, OM and $—O—Y—R^{\oplus}$

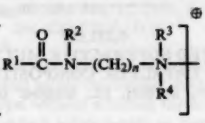
B is selected from O^- and OM

$X^{\ominus}$ is an anion

z is an integer from 0 to 2

with the proviso that only one of A and B can be O^- and z is of a value necessary for charge balance;

R is an amidoamine reactant moiety of the formula



wherein

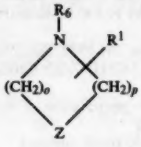
R^1 is alkyl, alkenyl, alkoxy, or hydroxyalkyl of from 5 to 22 carbon atoms each, or aryl or alkaryl of up to 20 carbon atoms;

R^2 is hydrogen or alkyl, hydroxyalkyl or alkenyl of up to 6 carbon atoms each or cycloalkyl of up to 6 carbon atoms, or polyoxyalkalene of up to 10 carbon atoms;

R^3 and R^4, are the same or different and are selected from alkyl, hydroxyalkyl, carboxyalkyl of up to 6 carbon atoms in each alkyl moiety, and polyoxyalkylene of up to 10 carbon atoms; in addition, R^3 and R^4 taken together with the nitrogen to which they are attached, may represent an N-heterocycle, structure in which the Y radical is bonded to a ring atom of said N-heterocycle other than the nitrogen of the R moiety;

n is an integer from 2 to 12; or

R is an N-heterocyclic radical of the formula



wherein

Z is N, S or O;

o is an integer from 0 to 3;

p is an integer from 1 to 3;

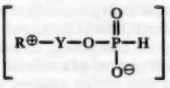
provided that the sum of o+p is from 3 to 4;

R^1 is defined as before and is linked to a ring carbon atom; and

R_6 is alkyl of from 2 to 6 carbon atoms

Y is alkylene, of up to 12 carbon atoms

M and M′, which may be the same or different, are (a) hydrogen, (b) an organic radical selected from alkyl or hydroxyalkyl of up to 6 carbon atoms, polyhydroxyalkyl of up to 10 carbon atoms, glyceryl, cycloalkyl of up to 6 carbon atoms, aryl or arylalkyl of up to 10 carbon atoms, or (c) a salt radical selected from alkali metals, alkaline earth metals, and mono-, di-, or tri-ethanolamine, provided that when either M or M′ is an organic radical (b), the other M and M′ must be hydrogen or a salt radical (c); or a phosphitaine of the formula:



R and Y are as defined above;

wherein the total of (a) and (b) does not exceed about 35% by weight of the total composition.

4,231,904

DETERGENT BARS WITH IMPROVED PROPERTIES

David Machin, South Wirral, England, assignor to Lever Brothers Company, New York, N.Y.

Filed Feb. 26, 1979, Ser. No. 15,496

Claims priority, application United Kingdom, Mar. 1, 1978, 8079/78

Int. Cl.[2] C11D *1/28, 17/00*

U.S. Cl. 252—557 9 Claims

1. A detergent bar containing from about 20% to about 70% by weight of water soluble salts of acyl (C_8 to C_{22}) isethionates and an amount of ethoxylated (about 1 to about 30 units) sorbitan ester, having from about 12 to about 22 carbon atoms in the acid derived portion effective to increase the slip properties of the bar.

4,231,905

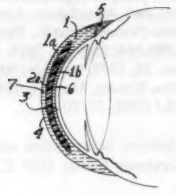
POLYMETHYLMETHACRYLATE CELLULOSIC COPOLYMER LENS MATERIAL

Charles W. Neefe, Big Spring, Tex., assignor to Neefe Optical Laboratory, Big Spring, Tex.

Continuation-in-part of Ser. No. 919,240, Jun. 26, 1978, abandoned, which is a continuation-in-part of Ser. No. 849,764, Nov. 9, 1977, Pat. No. 4,110,264, which is a continuation-in-part of Ser. No. 737,045, Oct. 29, 1976, abandoned, which is a continuation-in-part of Ser. No. 663,095, Mar. 2, 1976, abandoned, which is a continuation-in-part of Ser. No. 579,796, May 22, 1976, Pat. No. 3,957,049. This application Jun. 25, 1979, Ser. No. 51,345

Int. Cl.[3] C08L *1/10, 1/26*

U.S. Cl. 260—17 A 6 Claims



1. A gas permeable, dimensionally stable, optically clear contact lens material made by the steps of dissolving in monomeric methylmethacrylate 2% to 80% by weight of the methylmethacrylate of a soluble solid cellulose ether or ester polymer material which does not prevent the polymerization of the monomeric methylmethacrylate, polymerizing the methylmethacrylate cellulosic solution to form a ridged transparent contact lens material which has a faster recovery from being flexed than a polymethylmethacrylate or a cellulosic contact lens material.

4,231,906

INK COMPOSITION FOR NON WOVEN FABRICS OF SYNTHETIC FIBERS

Maurizio Giorgetti, Busto Arsizio, Italy, assignor to ATEX-/U.S.A., Inc., Asheville, N.C.

Filed Dec. 11, 1978, Ser. No. 968,297

Int. Cl.[3] C09D *11/06, 11/10, 11/12*

U.S. Cl. 260—19 N 6 Claims

1. An ink composition for the imprinting of polyolefinic non woven fabrics, comprising a pigment, a desiccant, a binder based on isophthalic and/or urethane varnish, a polyethylene protective wax and characterized in that it comprises between 54 and 64 percent by weight of an oleoresinous varnish consisting of a phenolic resin, crude linseed oil, tung oil and high boiling mineral oil, the composition being further characterized in that it imparts significant resistance to washing of the polyolefinic non woven fabrics such that when said fabric is washed as a delicate textile with a bland detergent, no discernible color change occurs after as many as six or seven cycles of washing, the composition being further characterized in that it imparts a feel or "hand" to said imprinted polyolefinic non woven fabric which remains unchanged after repeated washings and prolonged period of storage, the composition being further characterized in that said imprinted polyolefinic non woven fabric demonstrates substantial resistance to abrasion, the composition being further characterized in that said imprinting of polyolefinic non woven fabrics can be carried out lithographically with a desiccation time substantially less than two days, and characterized by a durable chemical linkage between the ink and the non woven fabric such that breakage does not occur under flexing of the fabric.

4,231,907

CATHODIC ELECTRODEPOSITION COMPOSITIONS EMPLOYING FATTY ACID DERIVATIVES

Ivan H. Tsou, Bloomfield Hills, Mich., assignor to Grow Group Inc., New York, N.Y.

Division of Ser. No. 859,295, Dec. 12, 1977, Pat. No. 4,155,824. This application Dec. 22, 1978, Ser. No. 972,208

Int. Cl.[2] C09D *3/58, 3/80, 5/40*

U.S. Cl. 260—23 AR 16 Claims

1. An organic coating composition containing a dispersion, solution or suspension of a coating composition containing an acrylic polymer; the coating composition characterized as containing (a) an ester resulting from reacting an acrylic polymer with a fatty acid, and (b) Formula A within said polymer molecule, and said Formula A group being derived from an oxirane ring, wherein the coating composition has substantially no oxirane rings therein:

Formula A: $-CH_2-C(Z)-CH_2-N=$

wherein Z is independently selected from the group hydrogen, hydroxyl, alkyl ether having from 1 to 6 carbon atoms; acyloxy having from 1 to 6 carbon atoms;

$(=O)$, $+OR'+_nH$, $+OR'+_nOH$ and $+O-R'(CH_2OH)+_nOH$;

wherein R′ is a saturated alkylene group of from 2 to 4 carbon atoms and n is a number 1 to 6.

4,231,908

COMPOSITION FOR USE BETWEEN POLYMERIC TIE PLATES AND CROSS TIES

Charles J. Pennino, Monroeville, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 846,685, Oct. 31, 1977, abandoned, which is a continuation-in-part of Ser. No. 766,447, Feb. 7, 1977, abandoned. This application Feb. 23, 1979, Ser. No. 14,336

Int. Cl.[3] C08L *91/00;* E01B *9/40*

U.S. Cl. 260—28.5 AS 5 Claims

1. A gap-filling, adhesive composition for use between a polymeric tie plate made of a polymer of the group consisting of polyolefins and polyurethanes and the dapped area of a wood, concrete or polyethylene railroad cross tie which comprises:

(a) 65 to 75 wt. % of an asphalt having a softening point in the range of 75° to 100° C. and a penetration in the range of 10 to 50;

(b) 10 to 20 wt. % of a styrene butadiene copolymer having a molecular weight in the range of 60,000 to 91,000; and

(c) 7 to 25 wt. % of a processing oil having a viscosity in the range of 427 poises at 37.78° C. to around 2,500 poises at 37.78° C. and a flash point in the range of 210° C. to 250° C. and the composition has a viscosity in the range of about 100 to 300 poises at 150° C.

4,231,909
POLYCHLOROPROPYLSILOXANE PLASTICIZED POLYVINYL CHLORIDE COMPOSITIONS

Frederick W. G. Fearon, Valparaiso, Ind., and Gary A. Vincent, Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Apr. 30, 1979, Ser. No. 34,820
Int. Cl.³ C08L 27/06, 83/08
U.S. Cl. 260—29.1 SB **3 Claims**

1. A plasticized polyvinyl chloride composition consisting essentially of a blend of (A) 88 to 99.9 percent by weight of polyvinyl chloride resin and (B) 0.1 to 12 percent by weight of a siloxane plasticizer which is a polysiloxane fluid containing at least 10 mole percent of chloropropylsiloxane units such that siloxane (B) is not exuded from the blend of (A) and (B), the chloropropylsiloxane units consisting essentially of units of the general formula

$$ClCH_2CH_2CH_2SiO\frac{(CH_3)_n}{\frac{3-n}{2}}$$

wherein n equals zero, one or two and any remaining siloxane units consisting essentially of units of the general formula

$$R_mSiO\frac{4-m}{2}$$

wherein each R is independently selected from the group consisting of methyl radicals and phenyl radicals and m equals one, two, or three.

4,231,910
PRIMER COMPOSITION

Edwin P. Plueddemann, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Feb. 8, 1979, Ser. No. 10,295
Int. Cl.³ C08L 61/28; C09J 3/16
U.S. Cl. 260—29.4 R **5 Claims**

1. A primer composition for application to a solid substrate to provide improved adhesion with thermoplastics, the composition consisting essentially of (A) 1 to 25 weight percent of an organosilicon compound selected from a group consisting of (1) 3-glycidoxypropyltrimethoxysilane, (2) 3-mercaptopropyltrimethoxysilane, (3) 2-mercaptoethyltrimethoxysilane, (4) 2-(3,4-epoxycyclohexyl)-ethyltrimethoxysilane and (5) partial hydrolyzates of (1), (2), (3) or (4) and (B) 75 to 99 weight percent of an alkoxymethyltriazine which is a product of etherification of a methyloltriazine with a monohydric alcohol having 4 carbons or less.

4,231,911
ABRASION RESISTANT COATING FOR FOAMED PLASTIC SUBSTRATES

Edgardo Santiago, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation of Ser. No. 926,189, Jul. 20, 1978, abandoned. This application Apr. 25, 1979, Ser. No. 33,279
Int. Cl.³ C08L 75/04
U.S. Cl. 260—29.6 NR **6 Claims**

1. A synthetic varnish composition adapted to be applied by conventional printing techniques and equipment to films of foamed plastic substrates to provide an adherent, lubricious, abrasion resistant, protective coating thereon, said composition comprising an emulsified aqueous mixture of polyurethane resin and polyethylene resin having a solids ratio ranging from 1:9 to 1:1, said polyethylene resin being emulsified with a non-ionic or anionic emulsifying agent, and up to 30% by weight of a low molecular weight alcohol, the amount of said alcohol being sufficient to depress the surface tension and coefficient of friction of said composition to improve printability and lubricity thereof and provide long-term shelf stability to said composition, the viscosity of said composition ranging from about 18 to 35 seconds as measured by Zahn Cup No. 2 at 65° to 85° F.

4,231,912
RUBBER LATEX COMPOUNDS

Henry Cowx, 67, Redlonning Rd., Hensingham, Whitehaven, Cumbria, England, and Jean-Luc Urbain, Salmagne, 55000 Bar le Duc (Meuse), France

Filed Mar. 1, 1979, Ser. No. 16,406
Int. Cl.² C08J 9/30
U.S. Cl. 260—29.7 SQ **10 Claims**

1. A latex compound which comprises an aqueous dispersion of a rubber latex and a sulphosuccinamate of the formula:

$$ROR_1—[OR_1]_n—NHCO—\underset{X}{\overset{H}{C}}—\underset{Y}{\overset{H}{C}}—COO^-$$

wherein R represents an alkyl or alkaryl group having from 7 to 18 carbon atoms, R_1 represents an alkylene group having 2 to 3 carbon atoms, n is an integer having a value of from 0 to 5 and one of the groups X and Y represents a hydrogen atom whilst the other represents a SO_3 group.

4,231,913
FLUID SHAPABLE SULFURIC COMPOSITIONS BASED ON ARYLALIPHATIC COPOLYMERS

Joseph Kyritsos, Craponne, and Jean Sacco, Lyons, both of France, assignors to Rhone-Poulenc-Textile, Paris, France

Continuation of Ser. No. 580,244, May 23, 1975, abandoned. This application Mar. 28, 1978, Ser. No. 890,992
Claims priority, application France, May 24, 1974, 74 18524
Int. Cl.³ C08L 77/10
U.S. Cl. 260—30.8 R **4 Claims**

1. A fluid, shapable, sulphuric composition which is optically anisotropic at temperatures below 100° C., consisting essentially of

a sulphuric solvent and

a solute which consists essentially of a copolyamide with a fiber forming inherent viscosity of at least 1 when measured on a solution in substantially pure sulphuric acid at 25° C. and at a concentration of 0.5 g of polymer in 100 ml of solution, consisting of units selected from the group consisting of: —CO—R_n—CO, —NH—R′—NH, and —CO—R″—NH units wherein 5–35 mol% of the total quantity of radicals R, R′ and R″ are flexible radicals selected from the group consisting of tetramethylene radicals, butenylene radicals, and tetramethylene or butenylene radicals substituted by one or more lower alkyl or halogen radicals; the remainder of the radicals, R, R′ and R″ consisting of rigid segments which can be identical or different and the majority of which are selected from the group consisting of p-phenylene, trans-1,4-cyclohexylene, trans-trans-1,4-butadienylene, and 2,5-pyridylene segments or their derivatives substituted by one or more lower alkyl or halogen radicals; and wherein n is 0 or 1 provided that when R′ is flexible it can only be present as tetramethylene or substituted tetramethylene, in an amount of 5–20 mol% of the total quantity of radicals R, R′ and R″ and in the sequence:

—NH—R″—CO—NH—R′—NH—CO—R′-
′—NH—

and that no unit —CO—R″—NH— is linked directly to another —CO—R″—NH—, said copolyamide consisting essentially of at least 10% by weight of the composition.

4,231,914

POLYURETHANE-BASED BINDER SYSTEM FOR THE PRODUCTION OF CASTING MOLDS OR CORES

Thorwald Born, Leipziger Str. 89, 3000 Hannover 1, and Karl-Heinz Brüning, August-Bebel-Str. 10, 3012 Langenhagen 1, both of Fed. Rep. of Germany

Filed May 30, 1978, Ser. No. 910,283

Claims priority, application Fed. Rep. of Germany, Dec. 31, 1977, 2759262

Int. Cl.³ C08K 5/10

U.S. Cl. 260—31.8 N 3 Claims

1. A composition useful for producing casting molds comprising about 100 parts of a flowable, granular solid, about two parts of a mixture including polyisocyanate and a polyol in proportions to form polyurethane upon reaction and an ester solvent, said solvent constituting from 40–60% of the resultant mixture, said ester having an acid component selected from the group consisting of an aliphatic dicarboxylic acid having from six to twelve carbon atoms and a benzene polycarboxylic acid having at least three COOH groups and an alcohol component having from six to thirteen carbon atoms and selected from aliphatic alcohol, cycloaliphatic alcohol, arylaliphatic alcohol, and aromatic alcohol.

4,231,915

USE OF DI-(CYCLOHEXYLETHYLMETHYLOL) PHTHALATES OR DI-(ETHYLCYCLOHEXYLMETHYLOL) PHTHALATES AS PLASTICIZERS FOR POLYVINYL CHLORIDE

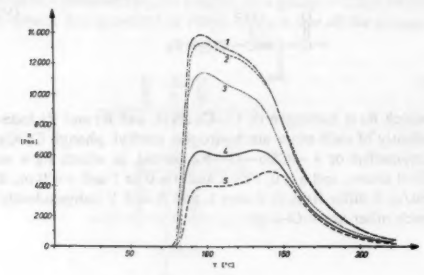
Manfred Kaufhold; Dieter Hepp, and Gerhard Menzel, all of Marl, Fed. Rep. of Germany, assignors to Chemische Werke Hüls Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Apr. 4, 1979, Ser. No. 26,983

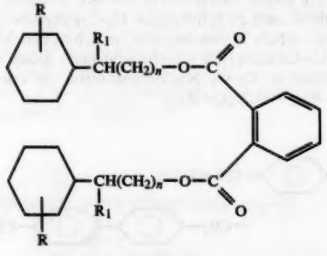
Claims priority, application Fed. Rep. of Germany, Apr. 4, 1978, 2814400

Int. Cl.³ C08K 5/11; C08L 27/06

U.S. Cl. 260—31.8 R 12 Claims



1. In a method of plasticizing polyvinyl chloride by adding a plasticizer to polyvinyl chloride, the improvement wherein the plasticizer is a di-(cyclohexylethylmethylol) phthalate or a di-(ethylcyclohexylmethylol) phthalate of the formula



wherein R is ethyl or hydrogen; R_1 is methyl or hydrogen; and n is an integer of 0–2; and when n is 2, R is H and R_1 is H; when n is 0, R is ethyl and R_1 is H, and when n is 1, R_1 is methyl and R is H; the two ester radicals being the same or different.

4,231,916

POTTING AND ENCAPSULATING MATERIAL FOR ELECTRONIC CIRCUITS

Thomas A. Knappenberger, Phoenix, and James F. Landers, Jr., Tempe, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 890,434, Mar. 27, 1978, abandoned. This application Oct. 16, 1979, Ser. No. 85,456

Int. Cl.³ C08L 63/02

U.S. Cl. 260—37 EP 9 Claims

1. Potting and encapsulating material for electronic circuits utilized in high acceleration and high thermal cycling environments consisting essentially of an intermixed compound of uncured thermosetting resin and curing agent in a flowable powder form with a particle size in the range of approximately 60 mesh to 200 mesh and curable in a range of approximately 125° F. to 212° F. at approximately ambient pressure, and hollow microspheres having a diameter in the range of approximately 5 microns to 300 microns said resin-curing agent and microspheres being intermixed in a ratio in the range of approximately 35 percent to 45 percent resin-curing agent to microspheres by weight.

4,231,917

HIGH TEMPERATURE CONCRETE COMPOSITES CONTAINING ORGANOSILOXANE CROSSLINKED COPOLYMERS

Arkady Zeldin, Rego Park; Neal Carciello, Patchogue; Lawrence Kukacka, Port Jefferson, and Jack Fontana, Shoreham, all of N.Y., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 6, 1979, Ser. No. 9,624

Int. Cl.³ C08L 83/04

U.S. Cl. 260—37 SB 9 Claims

1. A thermally stable polymer concrete composition comprising about 10–30% by weight of a liquid monomer mixture consisting essentially of an organosiloxane polymer containing pendant groups selected from the group consisting of CH_3, $CH{=}CH_2$, C_2H_5, C_6H_5, and mixtures thereof, and capable of being crosslinked, and at least one olefinically unsaturated crosslinking monomer in an amount of about 15% to 50% by weight of said monomer mixture, and about 70–90% by weight of an inorganic filler system containing silica sand and portland cement in ratios ranging from about 9 parts sand to 1 part cement, to, 7 parts sand to 3 parts cement.

4,231,918

PROCESS FOR THE MASS COLORATION OF LINEAR POLYESTERS

Fridolin Bäbler, Allschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sep. 15, 1978, Ser. No. 942,517

Claims priority, application Switzerland, Sep. 23, 1977, 11652/77

Int. Cl.³ C08K 5/23, 5/34, 5/35, 5/45

U.S. Cl. 260—40 P 9 Claims

1. A process for the mass coloration of a linear polyester by homogeneously mixing said polyester and a colorant which is a mixture consisting of (a) 0.05 to 0.35% by weight, based on the amount of polyester, of one thioindigo pigment, one dioxazine pigment or mixture of the two and (b) a polymer-soluble dye selected from the group consisting of anthraquinone, azo, azomethine, phthalocyanine, perinone, isondolinone, methine and triazine dyes.

4,231,919
SUSPENSION POLYMERIZATION OF STYRENE MONOMERS IN THE PRESENCE OF CARBON BLACK

Henry V. Isaacson, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 831,572, Sep. 8, 1977, abandoned. This application Feb. 26, 1979, Ser. No. 15,266
Int. Cl.³ C08J 3/20
U.S. Cl. 260—42.53 4 Claims

1. A suspension polymerization process for polymerizing in the presence of untreated carbon black containing absorbed oxygen a polymer comprising more than 40 weight percent styrene moiety which comprises suspending in a continuous liquid phase for polymerization a dispersion comprising monomer, initiator and said carbon black, said monomer comprising styrene moiety having a substituent with a Hammett sigma value more positive than about 0.06.

4,231,920
TRANSPARENT TO TRANSLUCENT FLAME-RETARDANT POLYCARBONATE COMPOSITION

Victor Mark, Evansville, and Charles V. Hedges, Mt. Vernon, both of Ind., assignors to General Electric Company, Pittsfield, Mass.

Filed Jan. 25, 1979, Ser. No. 6,473
Int. Cl.² C08K 5/42
U.S. Cl. 260—45.7 S 13 Claims

1. A transparent to translucent and flame retardant polycarbonate composition comprising a mixture of a high molecular weight aromatic polycarbonate; a minor amount of a flame retardant salt selected from the group consisting of organic alkali or organic alkaline earth metal salts of sulfonic acids or mixtures thereof; and, a minor amount of a coadditive solvent selected from the group consisting of water, organic protic compounds or organic aprotic compounds, or mixtures thereof.

4,231,921
NOVEL LIGHT STABILIZERS

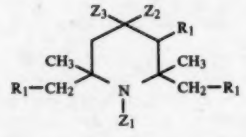
Paul Moser, Riehen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 10, 1978, Ser. No. 922,875
Claims priority, application Switzerland, Jul. 15, 1977, 8793/77
Int. Cl.² C08K 5/35; C07D 211/94, 211/98, 211/10
U.S. Cl. 260—45.75 R 10 Claims

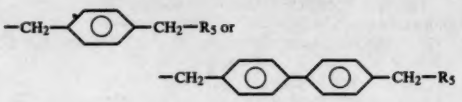
1. A compound of formula I

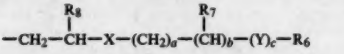
$$M^{q\oplus}\,[L'^{\ominus}]_{q/r}\cdot mA \qquad (I)$$

wherein $M^{q\oplus}$ is a metal ion carrying a double or triple positive charge and q is 2 or 3 and r is 1 or 2, the quotient q/r being 1, 1.5, 2 or 3, and L is a piperdine, which is substituted by at least one enolate group in the 1-position or 4-position and wherein the ring nitrogen is sterically hindered by alkyl substituents in the adjacent positions, having the formula II

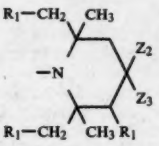

(II)

in which R_1 is hydrogen or C_1–C_4 alkyl and Z_1 is hydrogen, C_1–C_{12} alkyl, C_3–C_8 alkenyl, C_3–C_4 alkynyl, C_2–C_{21} alkoxyalkyl, C_7–C_8 aralkyl, an aliphatic acyl group having 1-4 C atoms, or one of the groups $—CH_2COOR_2$ or $—CH_2—CH(R_3)—OR_4$, or a $—(CH_2)_4—R_5$, $—CH_2—CH=CH—CH_2—R_5$,

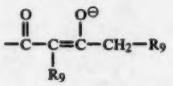

radical or a group of the formula III


(III)

in which R_2 is C_1–C_8 alkyl, C_3–C_6 alkenyl, phenyl, C_7–C_8 aralkyl or cyclohexyl and R_3 is hydrogen, methyl or phenyl and R_4 is an aliphatic C_1–C_{18} acyl group, an aromatic C_7 acyl group, an araliphatic C_8–C_9 acyl group or an alicyclic C_6–C_9 acyl group, in which the aromatic part can be unsubstituted or substituted by chlorine, C_1–C_4 alkyl, C_1–C_8 alkoxy and/or hydroxy, and R_5 is a group of the formula IV

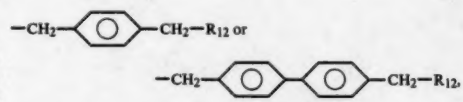

(IV)

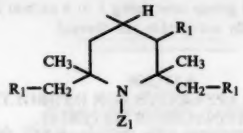
in which Z_2 and Z_3 are as defined below, and R_6 is a group of the formula V


(V)

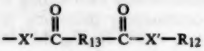
in which R_9 is hydrogen or C_1–C_4 alkyl, and R_7 and R_8 independently of each other are hydrogen, methyl, phenyl, C_2–C_9 alkoxymethyl or a $—CH_2—O—R_6$ radical, in which R_6 is as defined above, and a is 0, 1 or 2 and b is 0 or 1 and c is 0 or, if a and/or b differ from 0, is also 1, and X and Y independently of each other are —O— or

in which R_{10} is hydrogen, C_1–C_{12} alkyl, C_3–C_8 alkenyl, cyclohexyl, C_3–C_{21} alkoxyalkyl, C_7–C_{13} aralkyl, phenyl which is unsubstituted or substituted by C_1–C_8 alkyl and/or C_1–C_8 alkoxy, or a group $—CH_2—CH_2—O—R_6$, in which R_6 is as defined above, and Z_2 is hydrogen, C_2–C_{18} aliphatic acyloxy, benzoyloxy which is unsubstituted or substituted by C_1–C_8 alkyl or C_1–C_8 alkoxy, or C_2–C_{18} acylamido group which is unsubstituted or C_1–C_8 N-alkylsubstituted, or one of the groups $—R_{12}$, $—(CH_2)_d—R_{12}$,


in which d is 2 to 10 and R_{12} is a group of the formula VII


(VII)

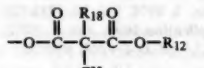
in which R_1 and Z_1 are as defined above, or Z_2 is also a group of the formula VIII

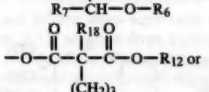

(VIII)

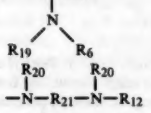
in which R_{12} is as defined above and X' is —O— or

in which R_{14} is hydrogen or C_1–C_4 alkyl, and R_{13} is $—(CH_2)_e—$ or a group

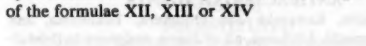
in which e is 0 to 8 and R_{15} and R_{16} independently of one another are hydrogen, C_1–C_{12} alkyl, C_3–C_8 alkenyl, C_7–C_{11} aralkyl, cyanomethyl, cyanoethyl or a group $—CH_2COOR_{17}$, in which R_{17} is methyl or ethyl, or Z_2 is one of the groups

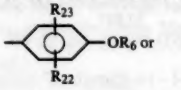

(IX)


(X)

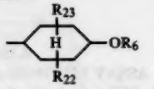

(XI)

in which R_6, R_7 and R_{12} are as defined above and R_{18} is hydrogen, C_1–C_8 alkyl, allyl, phenyl or benzyl and R_{19} is hydrogen, C_1–C_8 alkyl, allyl or benzyl and R_{20} is C_1–C_4 alkyl or a group of the formula V which is as defined above, and R_{21} is C_2–C_6 alkylene, cyclohexylidene, phenylene, diphenylene, 4,4'-diphenylene oxide or 4,4'-diphenylenemethane, or Z_2 is also a group of the formulae XII, XIII or XIV

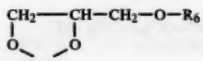

(XII)

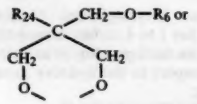

(XIII)

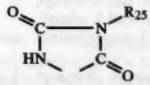
-continued


(XIV)

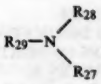
in which a, b, c, X, Y, R_6, R_7 and R_8 are as defined above and f, a' and b' are 0 or 1 and g is 0 or, if a' and/or b' differ from 0, is also 1, and R_{22} and R_{23} independently of one another are hydrogen, C_1–C_4 alkyl, cyclohexyl, phenyl, benzyl, α-methylbenzyl or α,α-dimethylbenzyl, and Z_3 is hydrogen or cyano, or Z_2 and Z_3 together are one of the groups XV, XVI or XVII


(XV)


(XVI)


(XVII)

in which R_6 is as defined above and R_{24} is hydrogen, methyl or ethyl and R_{25} is hydrogen, C_1–C_{18} alkyl, C_3–C_8 alkenyl, cyclohexyl, C_7–C_8 aralkyl or a group $—CH_2—COOR_{26}$ or $—CH_2—CH(R_8)—O—R_6$, in which R_{26} is C_1–C_{18} alkyl and R_6 and R_8 are as defined above, and m is 0, 1 or 2 and A is H_2O or an amine of the formula (XVIII)


(XVIII)

in which R_{27} is substituted or unsubstituted alkyl, cycloalkyl, aryl or aralkyl, a substituted or unsubstituted aminoalkyl or piperidinyl group, and R_{28} is hydrogen or substituted or unsubstituted alkyl or cycloalkyl, a substituted or unsubstituted aminoalkyl group or a piperidinyl group, or R_{27} and R_{28} together with the N atom form a pyrrolidine, piperidine or morpholine ring which is substituted by alkyl groups or is unsubstituted, and R_{29} is hydrogen or substituted or unsubstituted alkyl.

10. A polymeric material containing a compound of the formula I according to claim **1**.

4,231,922

IMPACT MODIFIED POLYARYLATE BLENDS

Lloyd M. Robeson, Whitehouse Station, N.J., assignor to Union Carbide Corporation, New York, N.Y.

Filed Jun. 18, 1979, Ser. No. 49,131

Int. Cl.[2] **C08L** *51/04, 67/02*

U.S. Cl. 260—45.95 G **24 Claims**

1. A thermoplastic molding composition having improved notched izod impact values after molding, said composition comprising in admixture:

(a) a polyarylate derived from a dihydric phenol and an aromatic dicarboxylic acid;

(b) a polyester derived from an aliphatic or cycloaliphatic diol, or mixtures thereof, and an aromatic dicarboxylic acid; and

(c) an impact modifier which is a graft copolymer of a vinyl aromatic, an acrylate, an unsaturated nitrile, or mixtures thereof, grafted onto an unsaturated elastomeric backbone

and having a tensile modulus of less than about 100,000 psi.

4,231,923

ASSAY METHOD AND COMPOUNDS

Richard J. Miller, Raleigh; Kwen-Jen Chang, and Pedro Cuatrecasas, both of Chapel Hill, all of N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed Oct. 13, 1977, Ser. No. 841,678

Claims priority, application United Kingdom, Mar. 28, 1977, 12867/77

Int. Cl.[2] C07C *103/52;* A61K *43/00*

U.S. Cl. 260—112.5 R **10 Claims**

1. A compound of formula (I):

$$H—X^1—X^2—X^3—X^4—(X^5)_m—(X^6)_n—OH \quad (I)$$

wherein

X^1 is selected from L-tyrosyl and N-alkyl-L-tyrosyl (wherein the alkyl has 1 to 4 carbon atoms) substituted in the phenol moiety at the 2-position or at both the 2- and 6-positions (with respect to the hydroxy group) with an iodine radioisotope;

X^2 is selected from glycyl and D-alanyl;

X^3 is selected from glycyl and L-alanyl;

X^4 is selected from L-phenylalanyl and L-4-chlorophenylalanyl;

X^5 is selected from L-leucyl, D-leucyl,, L-methionyl, D-methionyl, L-valyl, D-valyl, L-norleucyl, D-norleucyl, L-threonyl and D-threonyl;

X^6 is L-threonyl;

and m and n are each selected from O and I, provided that when they are both O then X^2 is D-alanyl;

together with their salts, esters, amides and N-alkylamides wherein the alkyl has 1 to 4 carbon atoms.

4,231,924

4-N-ACYLFORTIMICIN B DERIVATIVES AND THE CHEMICAL CONVERSION OF FORTIMICIN B TO FORTIMICIN A

John S. Tadanier; Jerry R. Martin, and Paul Kurath, all of Waukegan, Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Continuation-in-part of Ser. No. 888,085, Mar. 20, 1978, Pat. No. 4,155,902. This application Jan. 10, 1979, Ser. No. 2,436

Int. Cl.[2] C07C *103/52;* C07H *15/22*

U.S. Cl. 260—112.5 R **3 Claims**

1. A method of preparing 1,2',6'-tri-N-benzyloxycarbonyl fortimicin B, which method comprises:

reacting fortimicin A with N-[benzyloxycarbonyloxy] succinimide to form tetra-N-benzyloxycarbonyl-fortimicin A, and

hydrolyzing the tetra-N-benzyloxycarbonyl fortimicin A to form said 1,2',6'-tri-N-benzyloxycarbonyl fortimicin B.

4,231,925

PENTAPEPTIDES WITH ANALGESIC ACTIVITY ON PERIPHERAL ADMINISTRATION

Victor M. Garsky, Radnor, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Jul. 23, 1979, Ser. No. 59,911

Int. Cl.[3] C07C *103/52;* A61K *37/00*

U.S. Cl. 260—112.5 R **6 Claims**

1. A pentapeptide of the formula:

$$R^1—N—H—Tyr—N—R^2—D—Met—Gly—N—R^3—Phe—N—R^4—D—Ser—X$$

wherein

R^1 is hydrogen, methyl, ethyl, propyl, 2-methyl-2-pentenyl, 2-methyl-1-pentenyl, methylcyclopropyl, or methylcyclobutyl;

R^2, R^3, and R^4 are, independently, hydrogen or methyl; and X is an amino group, $-OR^5$, or $-CH_2OR^5$ where R^5 is hydrogen or an alkyl group containing 1 to 6 carbon atoms;

or a pharmaceutically acceptable salt thereof.

4,231,926

METHOD AND APPARATUS FOR HYDROLYZING KERATINACEOUS MATERIAL

Rowland Retrum, 1226 Wilton La., Kirkwood, Mo. 63122

Filed Dec. 11, 1978, Ser. No. 968,479

Int. Cl.[2] C07G *7/00;* A23J *1/10*

U.S. Cl. 260—123.7 **10 Claims**

1. The method of continuously hydrolyzing keratinaceous material comprising continuously delivering generally untreated such material to a vessel, heating the material within the laden vessel without a build-up of pressure to a temperature of not exceeding 212° F., violently agitating by beating the keratinaceous material in the said vessel through the rotation of agitating means to between about 150 to 350 rpm, continuing the violent agitation and heating of said material for a length of time required to beat the material to render it sufficiently wilted and to a flowable and pumpable consistency, continuously pumping the now flowable fluidized material from the said vessel and into a second vessel that is pressurized for hydrolyzation, heating the fluidized material while in the second vessel to a temperature of between about 265° F. to 365° F. and for a length of time to generate vaporization and incident pressure therein up to between about 25 to 150 psig, agitating the material in the second vessel for a period of time until hydrolyzation occurs, and then continuously pumping the hydrolyzed material from the said second vessel for eventual drying.

4,231,927

HYDRAZONO PENICILLIN DERIVATIVES

Riccardo Monguzzi; Giorgio Pifferi; Mario Pinza, and Giampietro Broccali, all of Milan, Italy, assignors to CRAF Sud, Aprilia Latina, Italy

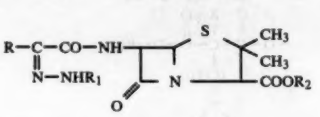
Filed Jun. 7, 1978, Ser. No. 913,325

Claims priority, application Italy, Jun. 7, 1977, 24337 A/77

Int. Cl.[3] C07D *499/68, 499/70*

U.S. Cl. 260—239.1 **7 Claims**

1. Hydrazono penicillin of the formula



wherein R represents phenyl, 2- or 3- thienyl or 2- or 3- furyl, R_1 represents hydrogen or alkyl containing from 1 to 4 carbon atoms, R_2 represents hydrogen, sodium, potassium, pivaloyloxymethyl or 1-(ethoxycarbonyloxy)-ethyl, in separated form E or Z or mixture of the same.

2. 6-(α-Methylhydrazonophenylacetamido)penicillanic acid sodium salt.

4,231,928

ANTIBACTERIAL AGENTS

Takayuki Naito, Kawasaki; Jun Okumura, Yokohama, and Hajime Kamachi, Ichikawa, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.

Continuation-in-part of Ser. No. 839,687, Oct. 5, 1977, abandoned, which is a continuation-in-part of Ser. No. 784,904, Apr. 5, 1977, abandoned. This application Apr. 24, 1979, Ser. No. 32,837

Int. Cl.[3] C07D *499/66, 499/68, 499/70*

U.S. Cl. 260—239.1 **16 Claims**

3. 6-[D-(−)-α-Phenyl-α-(7-hydroxy-4-oxo-4H-

pyrimido[1,2-b]pyridazin-3-ylcarboxamido)acetamido]penicillanic acid.

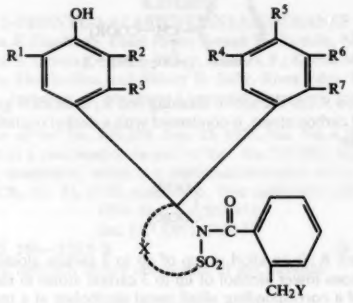
4,231,929

SULFAM(NA)PHTHALEINS

Stanley M. Bloom, Waban; Alan L. Borror, Lexington, and James W. Foley, Andover, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Sep. 23, 1977, Ser. No. 836,005
Int. Cl.[2] C07D *275/06, 417/10, 279/02;* C09B *17/04*
U.S. Cl. 260—243.3 **28 Claims**

1. A compound of the formula



wherein R^1 and R^2 each are selected from hydrogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, chloro and fluoro; R^3 is hydrogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms or hydroxy; R^2 and R^3 taken together represent the carbon atoms necessary to complete a fused benzene ring; R^4 and R^6 each are selected from hydrogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, chloro and fluoro; R^7 is hydrogen, hydroxy, alkyl having 1 to 4 carbon atoms or alkoxy having 1 to 4 carbon atoms; R^6 and R^7 taken together represent the carbon atoms necessary to complete a fused benzene ring provided R^2 and R^3 are taken separately when R^6 and R^7 are taken together; R^5 is selected from hydrogen, hydroxy, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, —N,N-(dialkyl)amino wherein each alkyl contains 1 to 4 carbon atoms, —N,N-(w-R^8alkyl)$_2$amino wherein R^8 is hydroxy or halo and said alkyl has 1 to 4 carbon atoms, —$NHCOCH_3$, piperidino, pyrrolidino, N-methylpiperazino, morpholino, thiomorpholino or tetrahydro-2H,4H-1,3,6-dioxazocino; R^4, R^5 and R^6 taken together represent the atoms necessary to complete a fused quinolizidine ring; X represents the atoms necessary to complete 2,3-dihydrobenz[d]-isothiazole-1,1-dioxide or 2,3-dihydronaphtho[1,8-d]-1,2-thiazine-1,1-dioxide; and Y is selected from chloro and bromo.

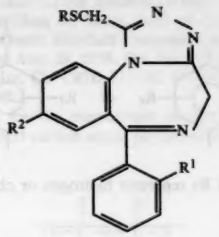
4,231,930

1-SUBSTITUTED THIOMETHYLTRIAZOLOBENZODIAZEPINES

Kentaro Hirai, Kyoto; Toshio Fujishita, Toyonaka, and Teruyuki Ishiba, Takatsuki, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Mar. 1, 1979, Ser. No. 16,615
Claims priority, application Japan, Mar. 9, 1978, 53-27524
Int. Cl.[3] C07D *487/04*
U.S. Cl. 260—245.5 **4 Claims**

1. A compound of the formula:



wherein

R is 1-4C alkylthio, 7-10C phenylakylthio, phenylthio and halo-phenylthio;

R^1 is hydrogen or halogen;

R^2 is halogen or nitro;

and its pharmaceutically acceptable acid addition salt.

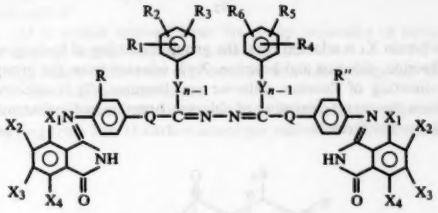
4,231,931

TETRAPHENYLKETAZINES AND ISOINDOLINONE PIGMENTS OBTAINED THEREFROM

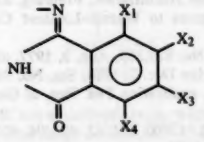
Ernst Model, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 30, 1979, Ser. No. 7,549
Claims priority, application Switzerland, Feb. 3, 1978, 1215/78
Int. Cl.[3] C07D *209/34*
U.S. Cl. 260—325 PH **6 Claims**

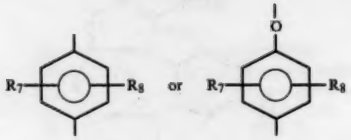
1. An isoindolinone pigment of the formula



wherein X_1, X_2, X_3 and X_4 represent hydrogen or halogen atoms, or one or two of X_1–X_4 represent alkoxy groups of 1 to 4 carbon atoms or phenoxy groups and the others represent hydrogen or halogen atoms, R and R″ represent hydrogen or halogen atoms or methyl or methoxy groups, R_1, R_2, R_4 and R_5 represent hydrogen, chlorine or bromine atoms or alkyl groups of 1 to 2 carbon atoms, R_3 and R_6 represent hydrogen or halogen atoms, alkyl or alkoxy groups of 1 to 2 carbon atoms or when R_3 and R_6 are independently in the meta or para position in respect to X, R_3 and R_6 may also be a group of the formula



Q represents a direct bond or a p-phenylene groups, n is 1 or 2 and X represents a group of the formula



wherein R_7 and R_8 represent hydrogen or chlorine atoms or methyl groups.

4,231,932

PHTHALIMIDOMETHYL CYCLOPROPANE CARBOXYLIC ACID ESTERS

Jacques Martel, Bondy; Jean Tessier, Vincennes, and Jean-Pierre Demoute, Montreuil-sous-Bois, all of France, assignors to Roussel Uclaf, Paris, France

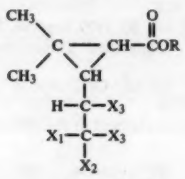
Continuation-in-part of Ser. No. 5,375, Jan. 22, 1979, and a continuation-in-part of Ser. No. 834,659, Sep. 19, 1977, abandoned. This application May 14, 1979, Ser. No. 38,563

Claims priority, application France, Sep. 21, 1976, 76 28279; Jul. 19, 1977, 77 22078; Mar. 17, 1978, 78 07780

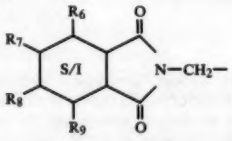
Int. Cl.³ C07D *209/48;* A01N *43/38*

U.S. Cl. 260—326 A **9 Claims**

1. A compound of the formula



wherein X_1 is selected from the group consisting of hydrogen, fluorine, chlorine and bromine, X_2 is selected from the group consisting of fluorine, chlorine and bromine, X_3 is selected from the group consisting of chlorine, bromine and iodine and R has the formula



R_6, R_7, R_8 and R_9 are individually selected from the group consisting of hydrogen, chlorine and methyl and S/I indicates that the ring may be aromatic, dihydro or tetrahydro.

4,231,933

NOVEL 3-HYDROXY-PYRROLIN-2-ONE DERIVATIVES

Gerhard Satzinger, Denzlingen; Manfred F. Herrmann, St. Peter, and Gustav Hechtfischer, Freiburg, all of Fed. Rep. of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

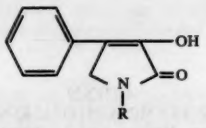
Division of Ser. No. 821,260, Aug. 3, 1977, abandoned. This application Dec. 7, 1978, Ser. No. 967,339

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1976, 2636722

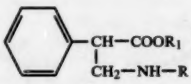
Int. Cl.³ C07D *207/12, 401/04, 407/04*

U.S. Cl. 260—326.5 FL **3 Claims**

1. A process for the preparation of compounds of the formula:



in which R is a saturated or unsaturated alkyl group of up to 6 carbon atoms or the group alk-ar, wherein alk is a methylene-, ethylene- or propylene- group and ar is a substituted or unsubstituted phenyl-, furyl-, or pyridyl- ring wherein the substituent is methoxy or chloro; wherein a compound of the formula:



in which R has the above meaning and R_1 is an alkyl group of up to 8 carbon atoms, is condensed with a dialkyl oxalate of the formula:

in which R_2 is an alkyl group of up to 3 carbon atoms, in an anhydrous lower alcohol of up to 3 carbon atoms in the presence of a corresponding alkali metal alcoholate at a temperature in the range of 70° to 90° C.

4,231,934

PROCESS FOR THE PRODUCTION OF N-(HYDROXYPHENYL) MALEIMIDES

Masayuki Oba; Motoo Kawamata; Hikotada Tsuboi, and Nobuhito Koga, all of Yokohama, Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

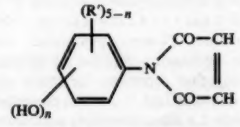
Filed Nov. 2, 1978, Ser. No. 956,971

Claims priority, application Japan, Nov. 2, 1977, 52-130905; Nov. 4, 1977, 52-131504

Int. Cl.³ C07D *207/44*

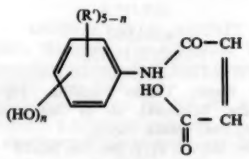
U.S. Cl. 260—326.5 FM **12 Claims**

1. A process for the production of a N-(hydroxylphenyl)-maleimide of the general formula:



(I)

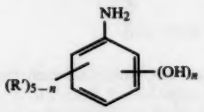
where R′ stands for H, CH_3, C_2H_5, F, Cl, Br or I and n is an integer of 1-5, comprising treating a N-(hydroxyphenyl)-maleamic acid expressed by the general formula:



II

where R′ and n each have the same meaning as indicated above, at a temperature of 0°-150° C. with a dehydrating agent selected from the group consisting of oxides and oxyacids of

sulfur or phosphorus, alkali metal and alkaline earth metal salts of said oxyacids and mixtures thereof to effect dehydrative cyclization of the maleamic acid, said maleamic acid being obtained by the reaction of an aminophenol expressed by the general formula:



III

where R′ and n each have the same meaning as indicated above, with maleic anhydride.

4,231,935
1-PHENYL-3-AZABICYCLO[3.1.0]HEXANES

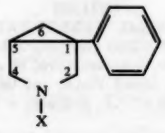
William J. Fanshawe, Pearl River; Joseph W. Epstein, Monroe; Lantz S. Crawley, Spring Valley, all of N.Y.; Corris M. Hofmann, Ho-Ho-Kus, and Sidney R. Safir, River Edge, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 809,339, Jun. 23, 1978, Pat. No. 4,131,611, which is a continuation-in-part of Ser. No. 723,402, Sep. 15, 1976, abandoned, which is a continuation-in-part of Ser. No. 601,128, Jul. 31, 1975, abandoned. This application Oct. 13, 1978, Ser. No. 951,411

Int. Cl.[2] **C07D** *209/52*

U.S. Cl. 260—326.5 B **29 Claims**

1. An optically active compound of the formula:



wherein the phenyl moiety is mono-substituted from the group consisting of C_1–C_6 alkoxy, amino, acetamido and hydroxy; X is selected from the group consisting of hydrogen, straight chain C_1–C_8 alkyl, and a moiety of the formula $C_nH_{2n}R_1$, wherein n is an integer from 1 to 3 and R_1 is selected from the group consisting of phenyl and p-fluorobenzoyl; the racemic mixture thereof; the mirror image thereof; and the non-toxic pharmaceutically acceptable salts thereof.

4,231,936
MITOMYCIN C DERIVATIVES

Kinichi Nakano; Chikahiro Urakawa, both of Machida, and Ryoji Imai, Shizuoka, all of Japan, assignors to Kyowa Hakko Kogyo Kabushiki Kaisha, Tokyo, Japan

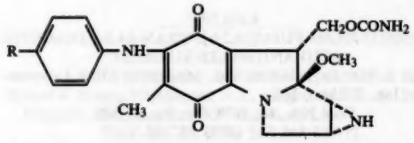
Filed Aug. 28, 1978, Ser. No. 937,376

Claims priority, application Japan, Aug. 31, 1977, 52-103542

Int. Cl.[3] **A61K** *31/40*; **C07D** *487/04*

U.S. Cl. 260—326.24 **3 Claims**

1. A compound of the formula:



[I]

wherein R is selected from the class consisting of a hydroxy group and an amino group.

4,231,937
PREPARATION OF ALKYLENE CARBONATES FROM ALKYLENE IODOHYDRINS

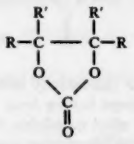
Jar-lin Kao, and Ming N. Sheng, both of Cherry Hill, N.J., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Aug. 28, 1978, Ser. No. 937,294

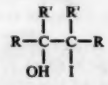
Int. Cl.[3] **C07D** *317/36, 317/38*

U.S. Cl. 260—340.2 **14 Claims**

1. A process for the preparation of alkylene carbonates having from 3 to 31 carbon atoms per molecule of the formula



wherein R and R′ are individually selected from the group consisting of alkyl groups having from 1 to 8 carbon atoms, aryl groups or lower alkyl or alkoxy, nitro or halogen substituted aryl groups, which comprises reacting in a liquid phase the corresponding alkylene iodohydrin having from 2 to 30 carbon atoms per molecule of the formula

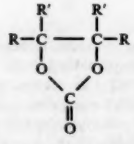


wherein R and R′ are as defined above, with carbon dioxide at a temperature in the range of about 30° C. to 120° C. and at a total pressure between about atmospheric and 1400 psig, at a pH value of between 3 and 10, in the presence of oxygen or an oxygen-containing gas and an effective amount of a catalytic mixture of

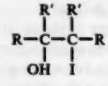
(1) an iodide selected from the group consisting of potassium, sodium and lithium iodides and

(2) cupric carbonate dihydroxide, and recovering the desired alkylene carbonate.

10. A process for the preparation of alkylene carbonates having from 3 to 31 carbon atoms per molecule of the formula



wherein R and R′ are individually selected from the group consisting of alkyl groups having from 1 to 8 carbon atoms, aryl groups or lower alkyl or alkoxy, nitro or halogen substituted aryl groups, which comprises reacting in a liquid phase the corresponding alkylene iodohydrin having from 2 to 30 carbon atoms per molecule of the formula

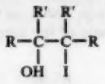


wherein R and R′ are as defined above, with carbon dioxide at a temperature in the range of about 30° C. to 120° C. and at a total pressure between about atmospheric and 1400 psig, at a pH value of between 3 and 10, in the presence of oxygen or an

oxygen-containing gas and an effective amount of a catalytic mixture of potassium iodide and calcium carbonate.

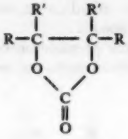
11. A process for the preparation of alkylene carbonates having from 3 to 31 carbon atoms per molecule of the formula

wherein R and R′ are individually selected from the group consisting of alkyl groups having from 1 to 8 carbon atoms, aryl groups or lower alkyl or alkoxy, nitro or halogen substituted aryl groups, which comprises reacting in a liquid phase the corresponding alkylene iodohydrin having from 2 to 30 carbon atoms per molecule of the formula

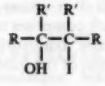


wherein R and R′ are as defined above, with carbon dioxide at a temperature in the range of about 30° C. to 120° C. and at a total pressure between about atmospheric and 1400 psig, at a pH value of between 3 and 10, in the presence of oxygen or an oxygen-containing gas and an effective amount of a catalytic mixture of calcium iodide and zinc carbonate.

12. A process for the preparation of alkylene carbonates having from 3 to 31 carbon atoms per molecule of the formula



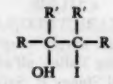
wherein R and R′ are individually selected from the group consisting of alkyl groups having from 1 to 8 carbon atoms, aryl groups or lower alkyl or alkoxy, nitro or halogen substituted aryl groups, which comprises reacting in a liquid phase the corresponding alkylene iodohydrin having from 2 to 30 carbon atoms per molecule of the formula



wherein R and R′ are as defined above, with carbon dioxide at a temperature in the range of about 30° C. to 120° C. and at a total pressure between about atmospheric and 1400 psig, at a pH value of between 3 to 10, in the presence of oxygen or an oxygen-containing gas and an effective amount of a catalytic mixture of iron iodide and calcium carbonate.

13. A process for the preparation of alkylene carbonates having from 3 to 31 carbon atoms per molecule of the formula

wherein R and R′ are individually selected from the group consisting of alkyl groups having from 1 to 8 carbon atoms, aryl groups or lower alkyl or alkoxy, nitro or halogen substituted aryl groups, which comprises reacting in a liquid phase the corresponding alkylene iodohydrin having from 2 to 30 carbon atoms per molecule of the formula



wherein R and R′ are as defined above, with carbon dioxide at a temperature in the range of about 30° C. to 120° C. and at a total pressure between about atmospheric and 1400 psig, at a pH value of between 3 and 10, in the presence of oxygen or an oxygen-containing gas and an effective amount of a catalytic mixture of palladium iodide and calcium carbonate.

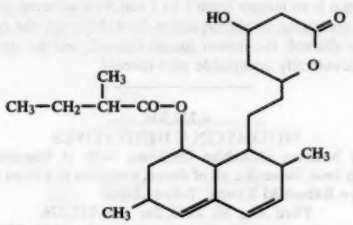
4,231,938

HYPOCHOLESTEREMIC FERMENTATION PRODUCTS AND PROCESS OF PREPARATION

Richard L. Monaghan, Somerset; Alfred W. Alberts, Short Hills; Carl H. Hoffman, Scotch Plains, and George Albers-Schonberg, Princeton, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jun. 15, 1979, Ser. No. 48,946
Int. Cl.³ C07D *309/30*
U.S. Cl. 260—343.5 **1 Claim**

1. The compound of the formula



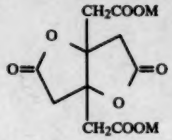
4,231,939

2,5-DIOXO-3H,6H-FURO[(3,2-b]FURAN-3A,6A-DIACETIC ACID AND SALTS THEREOF

Harold E. Hartzler, Goshen, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Filed Nov. 26, 1979, Ser. No. 97,307
Int. Cl.³ C07D *307/93*
U.S. Cl. 260—343.6 **5 Claims**

1. 2,5-dioxo-3H,6H,furo[3,2-b]furan-3a,6a-diacetic acid and salts thereof characterized by the structural formula



wherein M is hydrogen, an alkali metal or ammonium.

5. A method for the preparation of 2,5-dioxo-3H,6H-furo[3,2-b]furan-3a,6a-diacetic acid which comprises oxidizing 9,10-dihydroxy-1,4,5,8-tetrahydronaphthalene with ozone and hydrogen peroxide for a time sufficient to form the desired product.

4,231,940

2-OXABICYCLOOCTANE DERIVATIVES

Mark A. Sprecker, Sea Bright; Frederick L. Schmitt, Holmdel; Manfred H. Vock, Locust; Joaquin F. Vinals, Red Bank, all of N.J., and Jacob Kiwala, Brooklyn, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

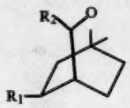
Division of Ser. No. 953,128, Oct. 20, 1978, Pat. No. 4,195,099. This application Jun. 7, 1979, Ser. No. 46,936

The portion of the term of this patent subsequent to Sep. 16, 1997, has been disclaimed.

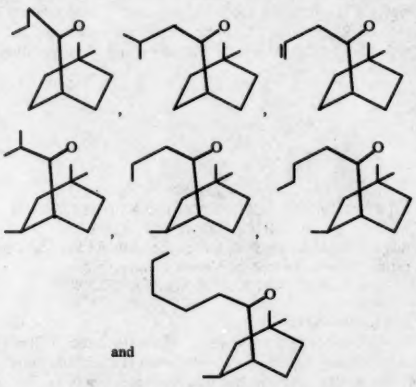
Int. Cl.³ C07D *309/04*

U.S. Cl. 260—345.1 **8 Claims**

1. A cyclic chemical compound having the structure:



wherein R_1 is selected from the group consisting of hydrogen and methyl and R_2 is C_3–C_5 alkyl or alkenyl, said compound being selected from the group consisting of



and

4,231,941

SYNTHESIS OF 2,5-DIHYDROFURAN

Robert F. Drury, Hightstown, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 25, 1979, Ser. No. 51,972

Int. Cl.³ C07D *307/28*

U.S. Cl. 260—346.11 **9 Claims**

1. Improved process for preparing 2,5-dihydrofuran by the dehydration of 1-butene-3,4-diol in the presence of a soluble mercury salt as catalyst in a dissociating solvent at a neutral or acidic pH at an elevated temperature, the improvement characterized in that the dehydration is carried out at a pH of 4 to 7 at 80°–120° C. in the presence of solid mercuric oxide.

4,231,942

STYRYL COMPOUNDS

Stefan Koller, Ramlinsburg, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

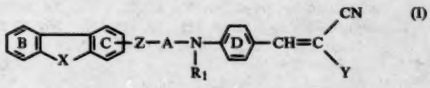
Filed Mar. 12, 1979, Ser. No. 20,109

Claims priority, application Switzerland, Mar. 21, 1978, 3082/78

Int. Cl.³ C07D *307/91*

U.S. Cl. 260—346.71 **11 Claims**

1. A styryl compound of the formula (I)



(I)

in which

X is $=CH_2$, —O—, —S— or the grouping $=NR_3$ wherein R_3 is hydrogen or an alkyl group having 1 to 4 carbon atoms,

Z is the —O— or —S— atom,

A is a straight-chain or branched-chain alkylene group having 2 to 4 carbon atoms,

R_1 is lower alkyl unsubstituted or substituted by hydroxy, cyano, phenyl or phenoxy,

R_2 is hydrogen, C_1–C_4-alkyl unsubstituted or substituted by OH, CN, halogen or C_1–C_4-alkoxy, C_1–C_4-alkoxy unsubstituted or substituted by OH, CN, halogen, lower alkyl or lower alkoxy, halogen or phenoxy unsubstituted or substituted by OH, CN, halogen, lower alkyl or lower alkoxy, and

Y is —CN, —$COOR_4$, —SO_2R_4 or $CONR_3R_5$, wherein R_3 has the meaning given above, R_4 is C_1–C_4-alkyl group or the phenyl group, R_5 is hydrogen or is the same as R_4,

and the benzene rings B, C and D can be further substituted by alkyl of 1 to 4 carbon atoms, alkoxy or 1 to 4 carbon atoms, halogen, —CN, —NO_2, —SO_2-alkyl, —SO_2NH_2, —SO_2NH-alkyl (C_1–C_4), —SO_2N (alkyl-C_1–C_4)$_2$ or —COO-alkyl-(C_1–C_4).

4,231,943

MALEIC ANHYDRIDE PRODUCTION

Stephen G. Paradis, Fairfax; David M. Marquis, Lafayette, both of Calif., and Kiran R. Bakshi, Murrysville, Pa., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 645,585, Dec. 31, 1975, abandoned. This application May 31, 1979, Ser. No. 44,781

Int. Cl.³ C07D *307/60*

U.S. Cl. 260—346.75 **5 Claims**

1. A process for producing maleic anhydride from n-butane which comprises:

(a) feeding n-butane and air to a reactor;

(b) contacting the butane and air in the reactor with a crystalline vanadium and phosphorus mixed oxide catalyst at reaction conditions including a temperature between 550° F. and 1000° F. so as to convert 15 to 28% of the butane per pass and obtain a reactor effluent containing maleic anhydride, unreacted butane, nitrogen, and oxygen, said catalyst consisting essentially of pentavalent phosphorus, vanadium and oxygen, said vanadium having an average valence in the range from about +3.9 to +4.6, said catalyst moreover having a phosphorus-to-vanadium atomic ratio in the range from about 0.9–1.8 to 1;

(c) removing maleic anhydride from the reactor effluent to obtain maleic anhydride-lean effluent;

(d) recycling a portion of the maleic anhydride-lean effluent to the reactor so as to maintain in the reactor an oxygen content of about 6–12 volume %;
(e) removing butane from the other portion of maleic anhydride-lean effluent; and
(f) recycling the removed butane to the reactor.

4,231,944

FLUORINATED POLYENES

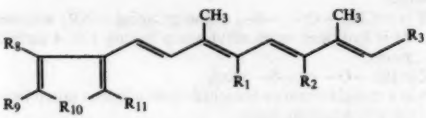
Ka-Kong Chan, Hopatcong, and Beverly A. Pawson, Verona, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 936,466, Aug. 24, 1978, Pat. No. 4,171,318, which is a continuation of Ser. No. 809,738, Jun. 24, 1977, Pat. No. 4,137,246, which is a continuation-in-part of Ser. No. 722,939, Sep. 13, 1976, abandoned, which is a continuation-in-part of Ser. No. 632,028, Nov. 14, 1975, abandoned. This application May 10, 1979, Ser. No. 37,803

Int. Cl.³ C07D *307/16, 307/12, 333/24*

U.S. Cl. 260—347.4 **5 Claims**

1. A compound having the formula:



II

wherein one of R_1 and R_2 is fluorine and the other is hydrogen; R_3 is formyl, hydroxymethyl, alkoxymethyl, carboxyl, alkoxycarbonyl, carbamoyl, mono(lower alkyl)-carbamoyl or di(lower alkyl)-carbamoyl; R_8 and R_{11} each are lower alkyl; R_9 is hydrogen or lower alkyl; and R_{10} is oxygen; or pharmaceutically acceptable salts thereof.

4,231,945

S-5-(AZIDOMETHYL OR AMINOMETHYL)-2-LOWER-ALKOXYTETRAHYDROFURANS

Stuart McCombie, West Orange, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 959,032, Nov. 8, 1978, which is a continuation-in-part of Ser. No. 922,605, Jul. 7, 1978, abandoned. This application Nov. 13, 1979, Ser. No. 93,722

Int. Cl.³ C07D *307/20*

U.S. Cl. 260—347.7 **2 Claims**

1. A lactol derivative selected from the group consisting of S-5-(azidomethyl)-2-lower alkoxytetrahydrofuran, S-5-(aminomethyl)-2-lower alkoxytetrahydrofurane, and an S-5-(N-protected aminomethyl)-2-lower alkoxytetrahydrofuran wherein said lower alkoxy has up to four carbon atoms and said N-protecting group is stable to acid and is removable with base.

4,231,946

14,15-METHYLENE DERIVATIVES OF THE ESTRANE SERIES AND METHODS FOR PREPARING SAME

Kurt Ponsold, Jena; Richard Prousa, Jena-Neulobeda; Michael Oettel, Jena; Joachim Strecke, Jena-Neulobeda, and Herbert Hoffmann, Jena, all of German Democratic Rep., assignors to VEB Jenapharm, Jena, German Democratic Rep.

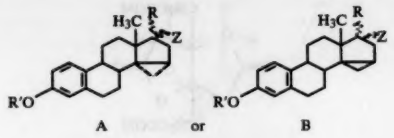
Filed Jun. 22, 1979, Ser. No. 50,998

Claims priority, application German Democratic Rep., Jun. 28, 1978, 206323

Int. Cl.³ C07J *1/00;* **A61K** *31/56*

U.S. Cl. 260—397.4 **12 Claims**

1. A compound of the formula



A or B

where R' is H or methyl;
R is a hydroxy, acetoxy, arylaminocarbonyloxy or alkylaminocarbonyloxy radical and
Z is H or a lower alkyl, or
R and Z together are oxygen.

7. A compound as defined in claim **1**, which is 3-methoxy-14β,15β-methylene-estra-1,3,5(10)-triene-17-one.

4,231,947

TANTALUM AND NIOBIUM CATALYSTS OR CATALYST PRECURSORS

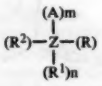
Richard R. Schrock, Brighton, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 883,628, Mar. 6, 1978, abandoned. This application Jan. 2, 1979, Ser. No. 32

Int. Cl.³ C07F *9/00*

U.S. Cl. 260—429 R **12 Claims**

1. A compound of the formula:



wherein R is cyclopentadienyl, $C_5H_xMe_{5-x}$, wherein x is an integer from 0 to 5, or neopentylidene, R^1 is neopentyl or benzyl, n is 0 or 1, R^2 is neopentylidene, benzylidene, tetramethylene or 2,3-dimethyltetramethylene, A is halo or a moiety of the formula $YR^3R^4R^5$ wherein Y is a group 5 element and R^3, R^4 and R^5 can be the same or different and are C_1–C_4 alkyl, aralkyl, aryl or bipyridyl and Z is tantalum or niobium: m=1 or 2.

4,231,948

LITHIUM DICYCLOPENTADIENYL TITANIUM HYDRIDE COMPOSITIONS

Guido P. Pez, Boonton, N.J., assignor to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Filed Nov. 3, 1978, Ser. No. 957,392

Int. Cl.³ C07F *7/28*

U.S. Cl. 260—429.5 **7 Claims**

1. A composition of matter of the formula: LiRR'TiH, wherein R and R' are cyclopentadienyl rings of the empirical formula, C_5H_5, wherein the ring hydrogens may be independently substituted with one or more groups inert toward lithium metal, said rings being bonded to titanium by sigma-bonds, pi-bonds or mixtures thereof, and said composition exhibiting a ^{13}C nuclear magnetic resonance spectrum in deuterated benzene, in which observed values for the chemical shifts of the ring carbons in R are different from the observed values for ring carbons in R', and said composition exhibiting an infrared spectrum in deuterated n-hexadecane in which a titanium metal-hydride absorption band is observed in the region of about 1250–1450 cm^{-1}.

4,231,949
PROCESS FOR PREPARING ORGANOTIN ESTERS

Mario Q. Ceprini, Cedarhurst, N.Y.; John D. Collins, Albrighton, England; Samuel Hoch, Brooklyn, N.Y., and Donald A. Wood, Warley, England, assignors to Albright & Wilson Limited, Warley, England

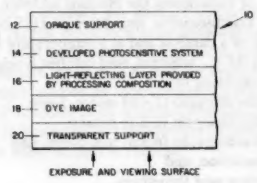
Filed Jul. 28, 1978, Ser. No. 928,795
Int. Cl.[2] C07F 7/22
U.S. Cl. 260—429.7 15 Claims

1. A process for preparing organotin esters of a carboxylic acid which comprises adding a base to an agitated mixture of (i) an organotin chloride of formula R'_2SnCl_2 wherein each of R′ is an organic group, and (ii) a carboxyl compound, which is a maleate half ester of formula $R^2OOC—CH=CH—COOH$ wherein R^2 is an alkyl group of 3–20 carbon atoms or a cyclohexyl group, the addition being carried out in the presence of added water, and producing a second mixture which is reacted to form an organotin product comprising an organotin ester with at least one maleate group attached to a tin atom, said product containing tin and chlorine with a weight ratio of chlorine to tin of less than 1:8, the amount of organotin chloride, carboxyl compound and base being such that for each mole of organotin chloride, there are 1.95–2.4 moles carboxyl compound and 1.9–2.5 equivalents of base, the proportion of the number of equivalents of base to equivalents of carboxyl compound being 0.9–1.3:1 and the proportion of equivalents of base to moles of added water being 0.001–0.5:1.

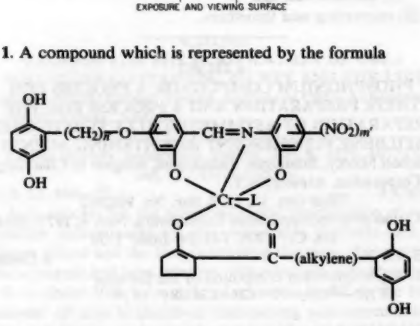
4,231,950
YELLOW AZOMETHINE DYE DEVELOPERS

Elbert M. Idelson, West Newton, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 836,078, Sep. 23, 1977, Pat. No. 4,166,741.
This application Mar. 23, 1979, Ser. No. 23,264
Int. Cl.[3] C07F 11/00
U.S. Cl. 260—438.5 R 4 Claims



1. A compound which is represented by the formula



where L represents molecules that can satisfy the coordination sphere of chromium, —(alkylene)— has from 0–6 carbon atoms, n′ is an integer of from 1–8 and m′ is 1 or 2.

4,231,951
COMPLEX SALT PHOTOINITIATOR

George H. Smith, Maplewood, and Peter M. Olofson, North Saint Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Division of Ser. No. 876,114, Feb. 8, 1978, Pat. No. 4,173,476.
This application Jun. 25, 1979, Ser. No. 51,901
Int. Cl.[3] C07F 9/90
U.S. Cl. 260—446 4 Claims

1. The process for the preparation of a triarylsulfonium hexafluoroantimonate salt comprising the steps of

(a) providing an aqueous solution of a watersoluble triarylsulfonium salt;

(b) adding solid $NaSbF_6$ or $KSbF_6$ to said aqueous solution to form a mixture; and

(c) recovering triarylsulfonium hexafluoroantimonate from said mixture.

4,231,952
PROCESS FOR THE PRODUCTION OF MONOISOCYANATE

Hartmut Knöfel, Odenthal-Erberich, and Klaus König, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 26, 1977, Ser. No. 827,913
Claims priority, application Fed. Rep. of Germany, Sep. 4, 1976, 2639931
Int. Cl.[3] C07C 118/00
U.S. Cl. 260—453 P 11 Claims

1. A process for the preparation of relatively low boiling monoisocyanates of the formula:

R—NCO

from the corresponding carbamic acid chlorides corresponding to the following general formula:

R—NH—COCl

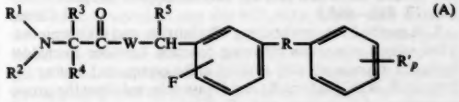
in which R represents an aliphatic hydrocarbon radical having from 1 to 5 carbon atoms; comprising adding an at least equivalent quantity, based on the hydrogen chloride bound in the carbamic acid chloride, of relatively high boiling organic monoisocyanate or polyisocyanate whose boiling point is higher than the boiling point of the relatively low boiling monoisocyanate to be produced, to the carbamic acid chlorides, optionally dissolved in inert organic solvents, and distilling off the relatively low boiling monoisocyanate from the thus-obtained mixture, optionally together with the solvent.

4,231,953
FLUORO SUBSTITUTED ARYL ESTERS AND THIOLESTERS OF AMINO ACIDS

Clive A. Henrick, Palo Alto, and Barbara A. Garcia, Boulder Creek, both of Calif., assignors to Zoecon Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 878,091, Feb. 16, 1978, which is a continuation-in-part of Ser. No. 824,947, Aug. 15, 1977, abandoned, and Ser. No. 779,886, Mar. 21, 1977, abandoned.
This application Jun. 4, 1979, Ser. No. 45,565
Int. Cl.[3] C07C 101/14, 101/16, 121/78
U.S. Cl. 260—465 D 29 Claims

1. A compound of the formula (A)

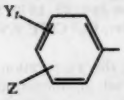


(A)

wherein,

R is oxygen, sulfur, methylene or carbonyl;

R′ is hydrogen, fluoro, bromo, chloro, trifluoromethyl, methyl, methoxy or methylthio;
p is zero, one or two; W is oxygen or sulfur;
R^1 is cycloalkyl, cycloalkenyl, cycloalkenyl substituted with halo or lower alkyl, or the group



in which t is zero, one, two, three or four; Y is independently selected from hydrogen, lower alkyl, lower haloalkyl, lower alkoxy, lower alkylthio, lower alkylcarbonyl, lower alkoxycarbonyl, lower acyloxy, halogen, cyano, nitro, and lower haloalkylthio; and Z is independently selected from the values of Y, cycloalkyl, and lower haloalkoxy; or Y and Z form a methylenedioxy group;
R^2 is hydrogen, lower alkyl, lower haloalkylcarbonyl, or formyl;
R^3 is lower alkyl of 2 to 5 carbon atoms, lower alkenyl of 2 to 5 carbon atoms, lower haloalkyl of 1 to 4 carbon atoms, lower haloalkenyl or 2 to 4 carbon atoms, or lower cycloalkyl of 3 or 4 carbon atoms;
R^4 is hydrogen or fluoro;
R^5 is hydrogen, cyano, ethynyl, methyl, trifluoromethyl or thioamide; and the salt thereof of a strong inorganic acid or organic acid.

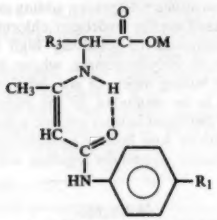
4,231,954

DANE SALT AND PROCESS FOR PREPARING AMINOPENICILLINS THEREFROM

Reinhold H. W. Bender, Kennett Square, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Apr. 20, 1979, Ser. No. 31,890
Int. Cl.³ C07C *121/60;* C07D *499/00*
U.S. Cl. 260—465 D **5 Claims**

1. A compound having the formula:



wherein R_1 is cyano or nitro; R_3 is phenyl, methylthiophenyl, nitrophenyl, aminophenyl, hydroxyphenyl, alkoxyphenyl in which alkoxy is of 1–4 carbon atoms or halogenophenyl; and M is hydrogen, an alkali metal or a triloweralkylamine.

4,231,955

SYNTHESIS OF ALKYL AND ALKYLAMINONITRILES

Clarence D. Chang, Princeton; William H. Lang, Pennington, both of N.J., and Rene B. LaPierre, Morrisville, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jul. 13, 1979, Ser. No. 57,547
Int. Cl.³ C07C *120/00, 121/43, 121/16, 121/18*
U.S. Cl. 260—465.1 **13 Claims**

1. A method for synthesizing alkylnitriles and alkylaminonitriles which comprises effecting reaction between formaldehyde, C_1–C_5 monohydric alcohol and a compound having the formula R_1R_2NH where R_1 and R_2 are selected from the group consisting of hydrogen and alkyl groups containing 1 to 5 carbon atoms at a temperature between about 500° F. and about 1200° F., a pressure between about 1 and about 100 atmospheres and a liquid hourly space velocity between about 0.2 and about 20 in the presence of a catalyst comprising a crystalline aluminosilicate zeolite having a silica to alumina ratio of at least about 12 and a constraint index within the approximate range of 1 to 12 and recovering from the resulting reaction mixture, a product containing at least one of the above nitrile compounds.

4,231,956

PROCESS FOR PREPARATION OF THIOETHERS

Daniel S. Sullivan, III, and Wilbur L. Bridges, both of Houston, Tex., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation of Ser. No. 776,261, Mar. 10, 1977, abandoned, which is a continuation of Ser. No. 599,998, Jul. 29, 1975, abandoned. This application Aug. 28, 1978, Ser. No. 937,316
Int. Cl.³ C07C *120/00, 121/16, 121/20, 149/20*
U.S. Cl. 260—465.8 R **9 Claims**

1. A process for the preparation of thioethers having the formula R′—S—R or R—S—R wherein R′ is a C_1 to C_{18} hydrocarbon ligand and R has the formula

wherein Z is H or CH_3 and X is an electron withdrawing group selected from the group consisting of carboalkoxy, nitrile and carboxamide groups, said process comprising
(i) the exothermic reaction of an activated alpha, beta unsaturated compound of the formula

wherein Z is H or CH_3 and X is an electron withdrawing group selected from the group consisting of carboalkoxy, nitrile and carboxamide groups, said compound being capable of undergoing the Michael addition reaction, with at least stoichiometric quantities of H_2S or R′SH in the presence of a catalyst and at a temperature in the range of 30° C. to 90° C., wherein, said catalyst is selected from the group consisting of
(a) 1,5-diazabicyclo (5,4,0) undec-5-ene,
(b) 1,4-diazabicyclo (2,2,2) octane,
(c) 1,5-diazabicyclo (4,3,0) non-5-ene, and
(d) quinuclidine, and
(ii) recovering said thioethers.

4,231,957

PHOSPHONIUM COMPOUNDS, A PROCESS FOR THEIR PREPARATION AND A PROCESS FOR THE PREPARATION OF ASYMMETRICALLY SUBSTITUTED STILBENE FLUORESCENT BRIGHTENING AGENTS

Michael Märky, Binningen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 12, 1978, Ser. No. 950,902
Claims priority, application Luxembourg, Nov. 4, 1977, 78449
Int. Cl.³ C07C *143/24;* D06P *1/38*
U.S. Cl. 260—505 C **6 Claims**

1. A phosphonium compound of the formula
$(R')_3P—\oplus CH_2—X'—CH{=}CH—R_1''—Y_1\oplus$

in which R_1'' is a phenyl radical which, in addition to the group $Y_1\ominus$, can carry one or two further substituents from the group comprising alkyl having 1 to 4 C atoms, alkoxy having 1 to 4 C atoms, cyclohexyl, alkenyl having 3 or 4 C atoms,

phenyl, sulpho, fluorine, chlorine, bromine or carbalkoxy having 2 to 5 C atoms, R' is alkyl having 1 to 4 C atoms, cycloalkyl having 5–7 C atoms or phenyl, $Y_1\ominus$ is $SO_3\ominus$ and X' is 1,4-phenylene, 4,4'-biphenylene or 1,4- or 2,6-naphthylene.

4,231,958

UREYLENE PHENYLENE ANIONIC NAPHTHALENESULFONIC ACIDS

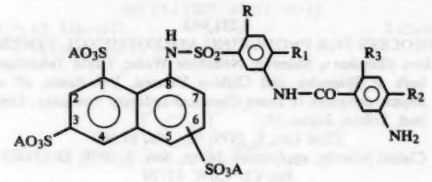
Gerald J. Siuta, Yonkers; Ransom B. Conrow, Pearl River; John F. Poletto, Nanuet, and Seymour Bernstein, New City, all of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 923,742, Jul. 11, 1978. This application Mar. 5, 1979, Ser. No. 17,204

Int. Cl.³ C07C *143/30*

U.S. Cl. 260—507 R **18 Claims**

1. A compound of the formula:



wherein R, R_1, R_2 and R_3 are selected from the group consisting of hydrogen and methyl; and A is a pharmaceutically acceptable salt cation.

4,231,959

PHOSGENE MANUFACTURE

Robert P. Obrecht, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Feb. 15, 1978, Ser. No. 878,032

Int. Cl.³ C07C *51/58*

U.S. Cl. 260—544 K **8 Claims**

1. An improved process for preparing phosgene by reacting chlorine with substantially pure carbon monoxide in a reaction zone to produce a product gas mixture comprising phosgene and unreacted carbon monoxide, separating substantially all of said phosgene from said unreacted carbon monoxide by passing the gas mixture through a partial condensation zone and recycling a major portion of said unreacted carbon monoxide directly to said reaction zone whereby the raw material yield of the process is increased and the amount of carbon monoxide discarded as a waste stream is reduced.

4,231,960

PROCESS FOR THE PURIFICATION OF UREA SOLUTIONS CONTAINING BIURET AND THE LIKE

Alfred Schmidt, Vienna, Austria, assignor to OMV Aktiengesellschaft, Vienna, Austria

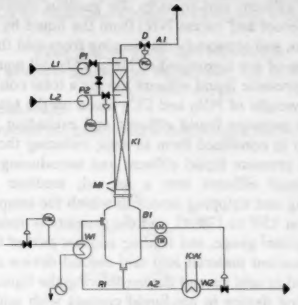
Filed Jun. 5, 1978, Ser. No. 912,328

Claims priority, application Austria, Jun. 8, 1977, 4077/77

Int. Cl.³ C07C *126/00*

U.S. Cl. 564—73 **3 Claims**

1. A process for the purification and regeneration of urea solution contaminated by urea conversion products such as biuret, triuret and the like, comprising the steps of contacting the contaminated urea solution with ammonia whereby about 1% to about 10% by weight of ammonia based on the total amount of urea is absorbed, maintaining said contaminated urea solution in contact with ammonia for a period of about 30–240 minutes at a temperature of about 110° to about 170° C. to react the conversion products with the ammonia, separating CO_2 and excess ammonia from said urea solution and separating said CO_2 and excess ammonia from each other, said steps of contacting, maintaining, separating CO_2 and excess ammonia



from the urea solution and separating the CO_2 from the excess ammonia being carried out simultaneously.

4,231,961

PROCESS FOR PREPARATION OF UREA

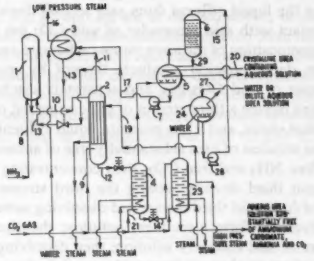
Keizo Konoki, Tokyo; Michio Nobue, Funabashi; Akito Fukui, Yokkaido, and Shigeru Inoue, Kamakura, all of Japan, assignors to Toyo Engineering Corporation and Mitsui Toatsu Chemicals, Incorporated, both of Tokyo, Japan

Filed Nov. 5, 1979, Ser. No. 91,444

Claims priority, application Japan, Nov. 30, 1978, 53-148131

Int. Cl.³ C07C *126/00*

U.S. Cl. 564—65 **1 Claim**



1. In a process for the preparation of urea, which comprises reacting NH_3 and CO_2 in a urea-synthesis reaction vessel under high temperature and high pressure conditions, in the presence of an excess of NH_3, then decomposing the ammonium carbamate contained in the effluent from the reaction vessel, separating the decomposition products from the effluent together with the excess NH_3 returning them to the reaction vessel, and concentrating the aqueous solution of urea obtained after separating the ammoniun carbamate and excess NH_3 from the reactor effluent, and then recovering the urea, the improvement which comprises: feeding NH_3 and a recovery solution containing NH_3, CO_2 and water into said reaction vessel and carrying out a urea synthesis reaction at a temperature of 180° to 200° C., under a pressure of 150 to 250 Kg/cm^2 gauge, while controlling the compositon of the reactant materials fed into said reaction vessel so that the NH_3/CO_2 molar ratio is 3.0 to 4.0 and the H_2O/CO_2 molar ratio is 0.3 to 0.6; feeding the liquid effluent from said reaction vessel and a part of the CO_2 gas to be used as a reactant material into a first, high pressure, decomposing and stripping device, the pressure of which is maintained at the same level as the internal pressure of said reaction vessel, and in said first device flowing the liquid effluent from the first reaction vessel in gas-liquid contact with said

part of said CO_2 gas, while heating said effluent at a temperature of from 170° C. up to the temperature in said reaction vessel to partially decompose the ammonium carbamate present in said effluent and to strip the gaseous decomposition products thereof and excess NH_3 from the liquid by means of said CO_2 gas, and separately discharging from said first device a first stream of gas comprised of NH_3, CO_2 and water vapor, and a high pressure liquid effluent having a total content of 15 to 25% by weight of NH_3 and CO_2 based on the total weight of the high pressure liquid effluent and excluding NH_3 and CO_2 present in combined form as urea; reducing the pressure of the high pressure liquid effluent and introducing the high pressure liquid effluent into a second, medium pressure, decomposing and stripping device in which the temperature is maintained at 150° to 170° C. and the pressure is maintained at 15 to 25 Kg/cm^2 gauge, and feeding another part of CO_2 to be used as a reactant material into said second device as a stripping gas, and in said second device flowing the liquid effluent from said first device in gas-liquid contact with said another part of said CO_2 gas to decompose more of the ammonium carbamate and to strip the gaseous decomposition products thereof by means of said another part of said CO_2 gas, and separately discharging from said second device a second stream of gas comprised of NH_3, CO_2 and water vapor, and a medium pressure liquid effluent having a total content of 5 to 15% by weight of NH_3 and CO_2 based on the total weight of the medium pressure liquid effluent and excluding NH_3 and CO_2 present in combined form as urea; reducing the pressure of the medium pressure effluent and then introducing same into a third, low pressure, decomposing and stripping device in which the temperature is maintained at 100° to 140° C. and the pressure is maintained at 1.5 to 3 Kg/cm^2 gauge and feeding the remainder of the CO^2 gas to be used as a reactant material into said third device as a stripping gas, and in said third device flowing the liquid effluent from said second device in gas-liquid contact with said remainder of said CO_2 gas to complete the decomposition of the ammonium carbamate and to strip the gaseous decomposition products thereof by means of said remainder of said CO_2 gas, and separately discharging from said third device a third stream of gas comprised of NH_3, CO_2 and water vapor, and a low pressure liquid effluent which is an aqueous solution of urea substantially free of ammonium carbamate, free NH_3 and free CO_2; then concentrating the effluent from said third device; cooling the third stream of gas discharged from said third device and dissolving same in an aqueous solvent to form a recovery solution; then increasing the pressure of said recovery solution; then dissolving the second stream of gas discharged from said second device in said recovery solution and flowing said recovery solution in indirect heat exchange contact with an aqueous urea solution to concentrate same; then increasing the pressure of said recovery solution and dissolving the first stream of gas discharged from said first device in said recovery solution and flowing said recovery solution in indirect heat exchange contact with water to generate low pressure steam; and then introducing the recovery solution containing dissolved therein the first, second and third streams of gas into said reaction vessel together with the starting NH_3 to effect the urea synthesis reaction.

4,231,962

3-PHENOXYBENZYLIDENEAMINES AND 3-BENZYLBENZYLIDENEAMINES

Dieter Reinehr, Kandern, Fed. Rep. of Germany, and Laurenz Gsell, Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

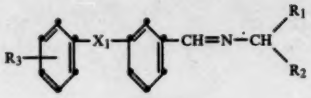
Filed May 29, 1979, Ser. No. 42,756

Claims priority, application Switzerland, Jun. 8, 1978, 6289/78; Apr. 10, 1979, 3406/79

Int. Cl.³ C07C *119/10*

U.S. Cl. 564—272 **3 Claims**

1. A compound of the formula



(I)

in which

R_1 is hydrogen or alkyl,

R_2 is alkyl, with alkyl groups denoted by R_1 and R_2 together not containing more than 12 C atoms, or R_1 and R_2 together being alkylene having 4–11 C atoms,

R_3 is hydrogen, halogen, methyl or methoxy, and

X_1 is oxygen or $—CH_2—$.

4,231,963

PROCESS FOR PRODUCING AMINOPHENOL ETHER

Akira Shinohara, Shimizu; Nobuhide Wada; Yukio Tokunaga, both of Shizuoka, and Chihiro Yazawa, Yokohama, all of Japan, assignors to Ihara Chemical Industry Company, Limited, Tokyo, Japan

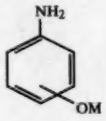
Filed Oct. 3, 1979, Ser. No. 81,460

Claims priority, application Japan, Nov. 2, 1978, 53-134482

Int. Cl.³ C07C *85/24*

U.S. Cl. 564—443 **2 Claims**

1. A process for producing an aminophenol ether which comprises reacting an alkali aminophenolate having the formula



wherein M represents an alkali metal atom; with an organic halide having the formula

R-X

wherein R represents a lower alkyl group, a lower alkenyl group or benzyl group; and X represents a halogen atom in substantially anhydrous condition in the presence of an alkali metal hydroxide and a quaternary salt selected from the group consisting of quaternary ammonium salts and quaternary phosphonium salts.

4,231,964

NITROAMINES, PROCESSES FOR THEIR MANUFACTURE AND THEIR USE AS DIAZO COMPONENTS

Rudolf Kühne, Frankfurt am Main, and Heinrich Hamal, Liederbach, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

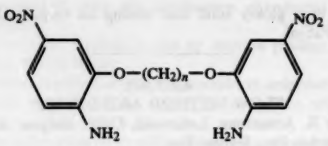
Continuation of Ser. No. 862,666, Dec. 21, 1977, abandoned. This application Jan. 18, 1979, Ser. No. 4,608

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1976, 2658329

Int. Cl.³ C07C *93/06*

U.S. Cl. 564—305 **5 Claims**

1. A compound having the formula



wherein n is 1 to 4.

4,231,965

PHENOXY PHENYL ETHANONES

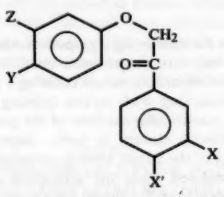
Robert A. Scherrer, White Bear Lake, and Richard M. Stern, Cottage Grove, both of Minn., assignors to Riker Laboratories, Inc., Northridge, Calif.

Division of Ser. No. 943,690, Sep. 19, 1978, Pat. No. 4,154,848, which is a division of Ser. No. 861,893, Dec. 19, 1977, Pat. No. 4,128,659. This application Mar. 5, 1979, Ser. No. 17,816

Int. Cl.[2] C07C *49/84, 65/16*

U.S. Cl. 568—327 **2 Claims**

1. A compound of the formula



wherein X and X′ are individually hydrogen, fluorine, chlorine, bromine or carboxyl or together can complete a benzo ring, Y is hydrogen, fluorine, chlorine, bromine, carboxyl, carboxymethyl or together with Z can form a propylene chain, provided that the compound contains one and only one of the rings including X and X′ and Y and Z, and provided further that the compound contains not more than a single carboxyl function.

4,231,966

METHOD OF CONDUCTING REACTIONS IN A TRICKEL-TYPE REACTOR

Günter Brandes, Hamburg; Johannes Wöllner, Kapellen Krs. Moers; Wilhelm Neier, and Werner Webers, both of Orsoy, all of Fed. Rep. of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Fed. Rep. of Germany

Division of Ser. No. 545,641, Jan. 30, 1975. This application Oct. 23, 1978, Ser. No. 953,508

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1974, 2404329

Int. Cl.[3] C07C *45/45*

U.S. Cl. 568—396 **10 Claims**

1. In a process for carrying out a condensation-hydrogenation reaction between hydrogen and a ketone where in an on-stream period the reactants pass downwardly in contact with a fixed bed of particulate condensation-hydrogenation catalyst having an average particle size no greater than about 2 mm in a trickle-type reaction zone, the improvement which comprises prior to instituting the on-stream period removing air from said reaction zone by passing a gas devoid of free oxygen downwardly through said reaction zone and said catalyst bed, interrupting the flow of said gas and flooding the reaction zone by introducing a liquid to flow upwardly through said catalyst bed and cover same and then removing said liquid from said reaction zone and substantially simultaneously introducing hydrogen and said ketone into said reaction zone to flow downwardly through said catalyst bed under condensation-hydrogenation conditions, thereby instituting the on-stream period.

4,231,967

PROCESS FOR PRODUCING SALICYLALDEHYDE

Teruo Matsuda, and Tetsuo Murata, both of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

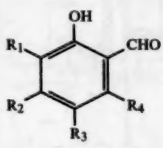
Filed Jun. 8, 1979, Ser. No. 46,933

Claims priority, application Japan, Jun. 13, 1978, 53-71811

Int. Cl.[3] C07C *45/00*

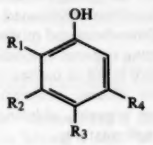
U.S. Cl. 568—433 **5 Claims**

1. A process for producing a salicylaldehyde of the formula (I),



(I)

wherein R_1, R_2, R_3 and R_4 are each a hydrogen atom, an alkyl, cycloalkyl, alkoxyl or hydroxyl group or a halogen atom, which comprises reacting formaldehyde or a formaldehyde liberating compound with a phenol of the formula (II),



(II)

wherein R_1, R_2, R_3 and R_4 are as defined above, in a solvent using as a catalyst at least one member selected from the group consisting of chromium (III) acetylacetonate, chromium formate, chromium acetate, chromium oxalate, chromium adipate, chromium benzoate, chromium bromide, chromium carbonate, chromium nitrate, iron acetylacetonate, iron benzoate and iron salicylate, at a temperature of 150° to 210° C.

4,231,968

STABILIZATION OF 1,1,1-TRICHLOROETHANE

Leonhardt Magiera; Raban Grundmann, both of Marl, and Dieter Krockenberger, Haltern, all of Fed. Rep. of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Jan. 22, 1979, Ser. No. 5,624

Claims priority, application Fed. Rep. of Germany, Jan. 27, 1978, 2803529

Int. Cl.[3] C07C *17/42*

U.S. Cl. 570—109 **9 Claims**

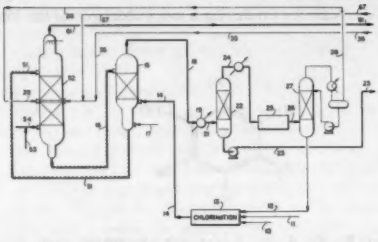
1. Stabilized 1,1,1-trichloroethane containing a stabilizer, the stabilizer consisting essentially of (a) 0.2–2% by weight of the total mixture of 2-methyl-2,3-epoxypropanol-(1); (b) 0.2–2% by weight of the total mixture of 2-methyl-2,3-epoxypropanol-(1) and 0.2–2% by weight of the total mixture of methyl tert-butyl ether; or (c) a mixture of either (a) or (b) and 0.5–1.5% by weight of the total mixture of nitromethane, 0.5–1.5% by weight of the total mixture of 1,2-epoxybutane or 0.001 to 0.01% by weight of the total mixture of diisopropylamine or N-methyl morpholine.

4,231,969

PRODUCTION OF HEXACHLOROCYCLOPENTADIENE

Herbert Riegel, Maplewood, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Filed Feb. 21, 1978, Ser. No. 879,799
Int. Cl.[2] C07C 23/08
U.S. Cl. 570—223 20 Claims



1. A process for producing hexachlorocylopentadiene, comprising:

contacting in a hexachlorocyclopentadiene production zone a feed selected from the group consisting of chlorinated saturated C_5 hydrocarbons chlorinated mono-olefinically unsaturated C_5 hydrocarbons and mixtures thereof with a salt mixture containing cuprous chloride and cupric chloride, said salt mixture being in molten form;

recovering a gaseous effluent containing hexachlorocyclopentadiene, other organics, chlorine, hydrogen chloride and entrained salt mixture;

cooling the gaseous effluent to condense hexachlorocyclopentadiene and other organics and provide a condensate including said entrained salt mixture;

separating said entrained salt mixture from the condensate;

introducing the separated entrained salt mixture into an oxidation reaction zone;

recovering chlorine and hydrogen chloride from the uncondensed gaseous effluent;

introducing recovered chlorine into the hexachlorocyclopentadiene production zone;

introducing recovered hydrogen chloride into the oxidation reaction zone;

contacting in the oxidation reaction zone molten salt mixture from the hexachlorocylopentadiene production zone and said separated entrained salt mixture with molecular oxygen, and said recovered hydrogen chloride to provide a molten salt enriched in cupric chloride; and

passing said molten salt mixture enriched in cupric chloride to the hexachlorocyclopentadiene production zone.

4,231,970

REACTION PRODUCTS OF UNSATURATED HYDROCARBONS WITH P_4S_{10} AND PSX_3

Eugene H. Uhing, Pleasantville, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Jul. 17, 1978, Ser. No. 925,129
Int. Cl.[3] C07F 9/04
U.S. Cl. 260—931 5 Claims

1. A composition of the formula:

$$+SCH_2CH_2\underset{|}{P}(S)S\frac{}{}_x$$

wherein x is ≥ 1.

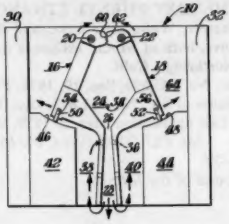
3. A method comprising reacting P_4S_{10} with ethylene at a reaction temperature of from about 130° C. to about 170° C. under autogenous pressure to form a reaction product characterized as a glossy solid and having an emperical formula $[C_8H_{16}P_4S_{10}]$.

4,231,971

FLOW METHOD AND DEVICE

Kenneth R. Armstrong, Lakewood, Calif., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Apr. 11, 1979, Ser. No. 29,151
Int. Cl.[3] F02M 9/02
U.S. Cl. 261—44 B 8 Claims



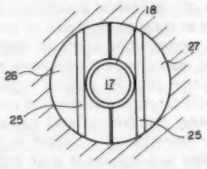
1. In a device for delivering a gaseous medium to utilization equipment having variable pressure conditions at its intake comprising, in combination, means defining a gaseous medium intake zone connecting with means defining a variable area throat zone for constricting the flow of the gaseous medium to increase the velocity thereof to sonic, means for adjustably varying the area of the throat zone in correlation with operating demands imposed upon the utilization equipment, wall means downstream from the throat zone arranged to provide a gradually diverging zone for efficiently recovering a substantial portion of the kinetic energy of the high velocity gaseous medium as static pressure whereby the velocity of the gaseous medium through the throat zone is sonic over a wide range of pressure conditions at the intake of the utilization equipment, the improvement comprising perforations in the wall means downstream and spaced from the throat zone and upstream and spaced from the exit of the gradually diverging zone, and passageway means behind the wall means interconnecting the perforations with the exit from the gradually diverging zone for recirculating a portion of the gaseous medium from the exit of the diverging zone to the perforations to thereby disturb the flow and shift the location of shock upstream from where it would otherwise occur to the location of the perforations when the pressure drop across the device is high.

4,231,972

SUPPLY APPARATUS

Masafumi Nakayama, Fujisawa, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed May 21, 1979, Ser. No. 41,162
Claims priority, application Japan, May 27, 1978, 53-63749
Int. Cl.[3] F02M 7/22
U.S. Cl. 261—44 D 10 Claims



1. A fuel supply apparatus of a venturi type for an internal combustion engine, comprising:

means defining a throat of an air suction passage which is

communicable with the combustion chamber(s) of the engine;

a throttle valve located in the air suction passage downstream of said throat;

a resistance member which is movable in response to the suction vacuum of the engine to cooperate with said throat;

a needle valve secured to said resistance member to be movable with the movement of said resistance member;

an inner cylindrical member which is adapted to be filled with fuel and which is securely disposed at the center of the air suction passage, said inner cylindrical member comprising a nozzle opening for discharging fuel, said nozzle opening facing said resistance member and said needle valve being movably disposed in said nozzle opening so as to meter the fuel discharged from said nozzle opening in accordance with the movement of said needle valve; and

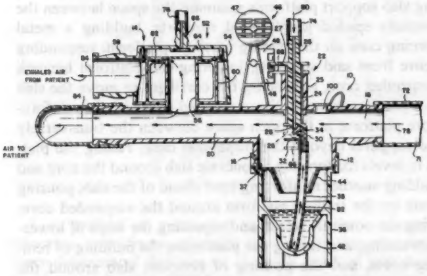
an outer cylindrical member securely disposed around and being coaxial with said inner cylindrical member, said outer cylindrical member being closed at its end farthest from said resistance member and comprising in its cylindrical wall a plurality of ports which are located downstream of the throttle valve, said outer cylindrical member being spaced apart from said inner cylindrical member to form a passage through which a mixture of air and fuel from said nozzle opening passes in order to be ejected through said plurality of ports into said air suction passage.

4,231,973

NEBULIZER WITH VARIABLE FLOW RATE CONTROL AND ASSOCIATED METHOD

Joe W. Young, Torrance, and Charles Odenthal, Upland, both of Calif., assignors to C. R. Bard, Inc., Murray Hill, N.J.

Filed Sep. 29, 1978, Ser. No. 947,109
Int. Cl.³ A61M *11/02*; B01F *3/04*
U.S. Cl. 261—78 A **11 Claims**



1. A nebulizer for supplying variable amounts of liquid to a gas flowing in a given path at a selected rate, comprising:

conduit means having a first axis for defining said given flow path;

a nebulization chamber intersecting said conduit means and extending away from said axis;

venturi means for forming a movable spray of liquid particles in said flowing gas, said venturi means and spray being movable between said conduit means and said chamber relative to said axis such that the amount of liquid entrained by said flowing gas is regulated according to the displacement of the venturi means from the axis and independent of the rate of gas flow;

liquid supply means in flow communication with said venturi means for supplying said venturi means with a liquid; and

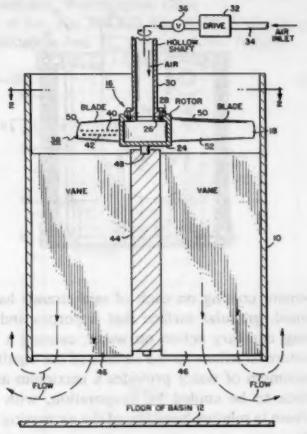
locking means for removably holding said venturi means in a selected location.

4,231,974

FLUIDS MIXING APPARATUS

Horst P. Engelbrecht, Canandaigua, and Howard K. Johnson, Webster, both of N.Y., assignors to General Signal Corporation, Rochester, N.Y.

Filed Jan. 29, 1979, Ser. No. 7,132
Int. Cl.³ B01F *13/02*; B03D *1/18*; C02F *1/74, 3/20*
U.S. Cl. 261—87 **10 Claims**



1. In apparatus for introducing a first fluid into a second fluid, said apparatus having a shaft which extends into said second fluid, an impeller on said shaft, said shaft and impeller having a passageway for said first fluid which extends through said shaft and said impeller into communication with said second fluid, the improvement which comprises a pumping impeller comprising a blade having a cross-sectional profile which defines an airfoil with a suction surface and a pressure surface on opposite sides thereof, said airfoil blade having a camber, a leading edge and a trailing edge which defines a chord therebetween, said camber having a maximum length in the range of about 2% to 6% of the length of said chord, the location of said maximum camber length being measured between the midline of said blade and said chord along a perpendicular to said chord in a region measured along said chord a distance of in a range about 20% to 60% away from said leading edge toward said trailing edge, the maximum thickness of said blade between said pressure and suction surfaces being in a range from about 10% to 18% of the length of said chord, and the portion of said fluid passageway in said impeller comprising a hole, extending through said suction surface in and only in a region of said suction surface located between perpendiculars from said chord to said suction surface in a range from about 60% to 80% of the length of said chord along said chord from said leading edge toward said trailing edge, the axis of said hole being perpendicular to said suction surface.

4,231,975

EVAPORATIVE COOLER AND LIQUID-GAS CONTACT PAD THEREFOR

John W. Peltier, 27465 Pacific St., San Bernardino, Calif. 92346

Filed Sep. 27, 1979, Ser. No. 79,362
Int. Cl.³ B01F *3/04*
U.S. Cl. 261—99 **1 Claim**

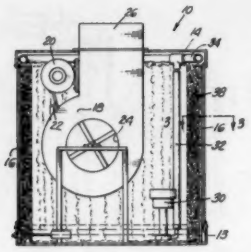
1. An evaporative cooler pad comprising:

a pad of loosely packed, randomly oriented, ribbon-like wood fiber strands of balsam poplar (Populus tacamahaca) having a thin layer of Portland cement surrounding and enclosing each strand;

said strands being separated from one another along the greater part of their respective lengths, forming intercon-

necting interstices, or passageways, from one side of the pad to the other, whereby air is allowed to flow freely through the pad;

said pad being dampened by water that is discharged onto the top part and allowed to flow by gravity down to the bottom of the pad, while air is drawn through said interstices and passageways from one side of the pad to the other;



the cement coating on each of said strands having a fine-grained, granular surface that is porous and produces a strong capillary action on water, causing a thin film of moisture to adhere to the surface of the coating, whereby a minimum of water provides a maximum area of moist surface to be cooled by evaporation, with a minimum increase in relative humidity of the air passing through the pad.

4,231,976

PROCESS FOR THE PRODUCTION OF CERAMIC PLUTONIUM-URANIUM NUCLEAR FUEL IN THE FORM OF SINTERED PELLETS

Klaus Bischoff, Kirchdorf, and Richard W. Stratton, Windisch, both of Switzerland, assignors to Gesellschaft zur Forderung der Forschung an der Eidgenossischen Technischen Hochschule, Zurich, Switzerland

Filed Mar. 14, 1978, Ser. No. 886,462

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1977, 2713108

Int. Cl.² G21C *21/00*

U.S. Cl. 264—0.5 **31 Claims**

1. A process for the production of a plutonium-uranium ceramic fuel wherein green pellets are formed by pressing from:

(i) a mixture of (a) an oxide, finely-divided carbon-containing oxide, carbide, nitride, oxycarbide, or carbonitride of plutonium, in the form of microspheres obtained by a wet chemical process, and (b) a like compound of uranium in a form selected from such microspheres and fine-grained to pulverulent materials; or

(ii) a like compound of a plutonium-uranium solid solution of which at least 1% is plutonium, in the form of microspheres obtained by a wet chemical process, alone or in admixture with a material selected from the said plutonium-compound microspheres, the said uranium-compound microspheres, and the said fine-grained to pulverulent materials,

and the green pellets are subjected to a heat treatment that includes a sintering to final density.

4,231,977

METHOD AND APPARATUS FOR IN-SITU PRODUCTION OF CONCRETE SLABS

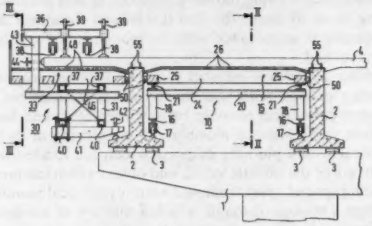
Philipp Schreck, Langbürgenerstrasse 2/13, 8 Munich 90, and Gerold A. Buck, Trollingerweg 39, 7050 Waiblingen, both of Fed. Rep. of Germany

Filed Aug. 9, 1978, Ser. No. 932,403

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1977, 2736524

Int. Cl.² E01D *21/04*

U.S. Cl. 264—33 **14 Claims**



1. A method for the in-situ step-by-step forming of an elongated reinforced concrete slab along the length of transversely spaced longitudinal permanent supports for said concrete slab bridging a span between two spaced supports which comprises progressively and permanently mounting said supports to span the path desired for the concrete slab, mounting on said supports for movement along the lengths of said supports carriages with leading reinforcing core support platforms and trailing slab support platforms spanning the space between the transversely spaced longitudinal supports, building a metal reinforcing core on the leading carriage platform, suspending said core from said supports, lowering the platform beneath the suspended core, advancing the carriages to move the slab support platform beneath the suspended core and the reinforcing core platform in the open space between the transversely spaced supports beyond the suspended core, raising the platforms to levels for forming a concrete slab around the core and for building another reinforcing core ahead of the slab, pouring concrete on the trailing platform around the suspended core, allowing the concrete to set, and repeating the steps of lowering, advancing, and raising the platforms, the building of reinforcing cores, and the pouring of concrete slab around the cores to form a continuous roadway on the longitudinal support.

9. The method of making a concrete roadbed on elevated transversely spaced longitudinally extending girders which comprise mounting carriages on said girders for movement along the length thereof, supporting concrete shaping and core support platforms on said carriages, constructing a metal rod concrete reinforcing core on the core supporting platform, pouring concrete around a previously constructed core on the forming platform, allowing the concrete to set, lowering the platforms, advancing the carriages on the girders to position the concrete forming platform under the newly constructed core and the core supporting platform under the span of the griders, raising the platforms to levels for concrete pouring and core formation, allowing the concrete to set, advancing the carriage to positions for concrete pouring and core forming, and raising the advanced carriages to the levels for such pouring and forming.

4,231,978

HIGH DENSITY LOW POROSITY REFRACTORY PRODUCT AND PROCESS FOR MAKING THE SAME

James A. Crookston, Mexico, Mo., assignor to A. P. Green Refractor, Mexico, Mo.

Continuation-in-part of Ser. No. 666,032, Mar. 11, 1976, abandoned. This application Feb. 26, 1979, Ser. No. 15,855
Int. Cl.[2] B29C *35/04*
U.S. Cl. 264—63 6 Claims

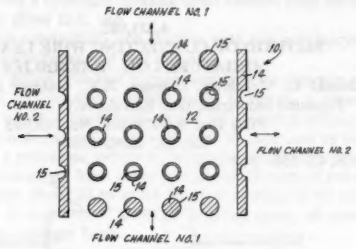
1. A process for producing a basic refractory brick or other refractory product, said process comprising the steps of preparing a fine grain refractory material consisting of a mixture of chrome ore and high purity periclase, said refractory being capable of passing a 65 mesh screen, tempering the refractory material with a solution containing magnesium chloride and/or magnesium sulfate, pressure-forming the tempered refractory material into larger size agglomerated, predensified and unsintered pieces, drying the agglomerated pieces at a temperature below the sintering temperature of the refractory material, crushing the agglomerated pieces to provide predensified unsintered grains, sizing the predensified unsintered grains into a suitable mix for pressing to a shape, moistening the mix, pressing the mix into objects of a desired refractory shape, drying the shaped objects, and firing the shaped objects at a temperature of at least 3000° F. to yield refractory products having said desired shape.

4,231,979

HIGH SURFACE AREA PERMEABLE MATERIAL

Eugene W. White; William M. Hanusiak, both of State College, Pa., and Rodney A. White, Torrance, Calif., assignors to Research Corporation, New York, N.Y.

Division of Ser. No. 859,135, Dec. 9, 1977, Pat. No. 4,190,079, which is a division of Ser. No. 713,258, Aug. 10, 1976, Pat. No. 4,075,092. This application Oct. 12, 1979, Ser. No. 84,126
Int. Cl.[3] B01D *3/00*
U.S. Cl. 264—81 13 Claims



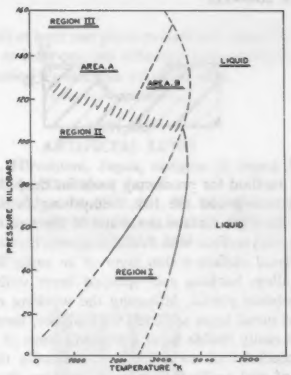
1. A method of producing an integral, three-dimensional structure providing a plurality of separate, interpenetrating, three-dimensional domains or channels, each of said domains or channels being a closed system of connected porosity or permeability with multiple interconnections only with respect to its respective domain or channel, each of said domains or channels being interpenetrating within said structure, which comprises filling or impregnating with a settable or curable liquid a porous, permeable, three-dimensional structure characterized by having a single interpenetrating, three-dimensional, multiple-connected channel or flowpath therein defined by solid material making up said three dimensional structure such that said flowpath or channel is occupied by said settable or curable liquid, removing said settable or curable liquid from said three-dimensional structure such that the surface of the solid material originally making up said three-dimensional structure and defining said flowpath or channel therein is coated with said settable or curable liquid, curing or setting said curable or settable liquid on said surface and removing from said structure the resulting coated solid material originally making up said structure thereby creating a second interpenetrating, three-dimensional, multiple-connected channel or flowpath within said structure, said second channel or flowpath being defined by the resulting cured or set curable or settable liquid coating the surface of the solid material originally making up said structure.

4,231,980

LARGE BORON NITRIDE ABRASIVE PARTICLES

Francis R. Corrigan, Westerville, Ohio, assignor to General Electric Company, Worthington, Ohio

Continuation of Ser. No. 394,632, Sep. 6, 1973, abandoned. This application Jan. 21, 1977, Ser. No. 760,853
Int. Cl.[3] C04B *35/58*
U.S. Cl. 264—84 6 Claims



1. A method for producing large-sized, high density particles comprising the steps of:

(a) placing in a reaction holder a reaction charge consisting essentially of low-density-recrystallized pyrolytic boron nitride and

(b) subjecting said reaction holder and reaction charge to a shock wave to create pressure and temperature conditions in the high density boron nitride direct conversion region of the boron nitride phase diagram where the stable form of boron nitride is high-density boron nitride to produce in said holder high-density boron nitride particles of at least 50 microns in size.

4,231,981

CADMIUM MERCURY TELLURIDE SPUTTERING TARGETS

Horst E. Hirsch, and Robert W. Smyth, both of Trail, Canada, assignors to Cominco Ltd., Vancouver, Canada

Filed Nov. 13, 1978, Ser. No. 960,198
Int. Cl.[2] C04B *35/50*
U.S. Cl. 264—102 5 Claims

1. A method for the preparation of substantially crack-free sputtering targets of cadmium mercury telluride of the general formula $Cd_xHg_{1-x}Te$ wherein x has values in the range of about 0.14 to 0.60 which comprises the steps of preparing finely divided cadmium mercury telluride of desired composition, said finely divided cadmium mercury telluride having particle sizes all less than 150 μ, mixing the particles of the finely divided cadmium mercury telluride to obtain a substantially even particle size distribution, preheating a die of desired dimensions to a temperature in the range of about 100° to 300° C, adding a predetermined amount of mixed particles to said die evacuating the die to a pressure of less than about 133 Pa absolute, applying a compacting pressure to said amount for a period of time not less than about one minute to compact the finely divided cadmium mercury telluride into a coherent

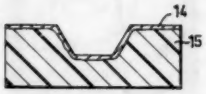
compact having a density of at least 97% of theoretical density, releasing the pressure and removing the compact having predetermined dimensions from the die, said predetermined amount of mixed particles being sufficient to form said compact of predetermined dimensions.

4,231,982

METHOD FOR THE PRODUCTION OF TOOLS FOR DEEP DRAWING, MOULDING, EXTRUDING AND THE LIKE

Hans B. E. Jansson, Sölvesborg, Sweden, assignor to AB Volvo, Goteborg, Sweden

Filed May 20, 1975, Ser. No. 579,278
Int. Cl.[3] B29C *1/02;* B22C *7/00;* B21K *5/20*
U.S. Cl. 264—112 **6 Claims**



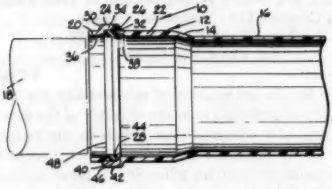
1. A method for producing tools for deep drawing, moulding, extruding and the like, comprising forming a working model having a surface the shape of the tool to be produced, coating said surface with a release agent, thermally spraying on said coated surface a thin layer of an easily fusible metal or metal alloy, backing said sprayed layer with a stiffener of heat-resistant plastic, loosening the working model from the sprayed metal layer stiffened with plastic, thermally spraying on said easily fusible layer a wearing layer of the material of the intended tool, to a depth substantially thicker than the depth of said easily fusible layer, backing the wearing layer with a plastic that withstands a temperature sufficiently high to fuse said easily fusible layer, heating the assembly of easily fusible layer and wearing layer and plastic backings to a temperature sufficiently high to fuse said easily fusible layer, and separating the wearing layer and its plastic backing from the easily fusible layer and its plastic backing.

4,231,983

PLASTIC PIPE JOINT AND METHOD AND ASSEMBLY FOR MAKING SAME

David W. French, Littleton, Colo., assignor to Johns-Manville Corporation, Denver, Colo.

Division of Ser. No. 826,586, Aug. 22, 1977, Pat. No. 4,170,448. This application Jan. 29, 1979, Ser. No. 7,267
Int. Cl.[2] B29D *23/00*
U.S. Cl. 264—249 **3 Claims**



1. A method of forming the bell end of a plastic pipe, said method comprising:
(a) heating one end section of said pipe to the state of thermal deformability;
(b) forming from said heated end section a diametrically enlarged axial portion and a transverse end wall joining said enlarged portion with the rest of said pipe;
(c) after forming said enlarged portion, substantially uniformly thickening its cross-sectional configuration by decreasing its length;
(d) while thickening the cross-sectional configuration of said enlarged portion, integrally forming outwardly protruding rib means on the inner surface of said transverse end wall, said rib means being located radially inwardly from the inner surface of said enlarged portion so as to define a space therebetween;
(e) concentrically positioning a circumferential sealing gasket within said enlarged portion and against said end wall such that an end segment of said enlarged portion extends beyond said gasket, said gasket being shaped such that portions thereof are located within said space; and
(f) radially inwardly deforming said end segment whereby to lock said sealing gasket in place.

4,231,984

PROCESS FOR THE PRODUCTION OF MOLDED PHOSPHATE BONDED REFRACTORY ARTICLES

Franz Hofmann, Neuhausen, Switzerland, assignor to Georg Fischer Aktiengesellschaft, Switzerland

Filed Mar. 31, 1978, Ser. No. 892,020
Claims priority, application Switzerland, Apr. 15, 1977, 4695/77
Int. Cl.[2] B28B *1/16*
U.S. Cl. 264—256 **13 Claims**

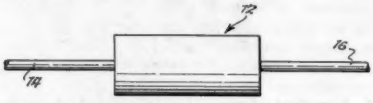
1. A process for the production of a thin-walled phosphate-bonded molded article which is refractory at temperatures above 1300° C. which comprises applying once or repeatedly to a preshaped wire fabric or mesh a composition comprising a refractory filler and $Al(H_2PO_4)_3.H_2O$ or a polyphosphate as binder and thereafter curing said composition at a temperature below 400° C. on said preshaped wire fabric or mesh to provide a single or multi-layered, thin-walled structure, said preshaped wire fabric or mesh permanently remaining in the resultant molded article and serving as a reinforcing agent for said article.

4,231,985

METHOD OF CONNECTING WIRE LEADS TO MINIATURE COIL ASSEMBLIES

Donald C. McElheny, Delevan, N.Y., assignor to American Precision Industries, Inc., Buffalo, N.Y.

Filed Dec. 9, 1976, Ser. No. 748,933
Int. Cl.[3] B29C *6/04*
U.S. Cl. 264—262 **5 Claims**



1. A method for fastening an end of an electrical wire lead to each open end of a coil core having a through bore extending between its open ends comprising the steps of:
providing a mold to receive each end of said core, said mold forming a cavity about each end of said core;
disposing an electrical lead in the mold cavity at each end of the core, each said lead having a shoulder adjacent its end, each said lead end being of smaller dimension than said bore to provide a clearance between the outer surface of each lead end and the bore surface and positioned coaxially with and extending into said bore with said lead shoulder abutting the core end;
providing a gate communicating between the mold cavity and the bore at each end of said core; and
injecting molding material into said cavity with sufficient pressure so that said clearance becomes filled with said molding material whereby said lead becomes firmly affixed to said coil core to resist axial and rotational movement relative thereto.

4,231,986
GREASE COMPATIBLE MINERAL OIL EXTENDED POLYURETHANE

Melvin Brauer, East Brunswick, and Thaddeus F. Kroplinski, Old Bridge, both of N.J., assignors to NL Industries, Inc., New York, N.Y.

Division of Ser. No. 877,905, Feb. 15, 1978, Pat. No. 4,168,258. This application Apr. 6, 1979, Ser. No. 27,819
Int. Cl.³ B29H *9/00*
U.S. Cl. 264—272 **13 Claims**

1. A process for sealing an insulated electrical device comprising the steps of introducing into said device a composition comprising mineral oil, polyurethane precursor and coupling agent,

(a) said polyurethane precursor comprising the reaction product of

(i) a polyisocyanate compound or a polyisocyanate prepolymer prepared by the reaction of a polyisocyanate compound with a polyol selected from the group consisting of castor oil, polyether polyols, hydroxyl bearing homopolymers of dienes, hydroxyl bearing copolymers of dienes, and combinations thereof, wherein at least about 0.25 equivalents of the polyisocyanate compound per 1.0 equivalents of the polyisocyanate compound used is a liquid long chain aliphatic polyisocyanate, and

(ii) a polyol selected from the group consisting of castor oil, polyether polyols, hydroxyl bearing homopolymers of dienes, hydroxyl bearing copolymers of dienes, and combinations thereof,

(b) said mineral oil being characterized by having from about 1.0 to about 30% aromatic carbon atoms, based on the total number of carbon atoms present in the mineral oil, and

(c) said coupling agent being characterized by

(i) being miscible in all proportions with said mineral oil,

(ii) having a total solubility parameter from about 7.0 to about 9.5,

(iii) having a hydrogen bonding index number from about 6.0 to about 12.0, and

(iv) being substantially non-reactive with said polyisocyanate prepolymer and said polyol,

reacting said polyol with said polyisocyanate in the presence of said mineral oil and said coupling agent to obtain a grease compatible, cured, cross-linked, mineral oil extended polyurethane which is non-spewing, and which is characterized by the presence of a polydiene moiety in the polyurethane structure, and which comprises from about 8 to about 45 parts of polyurethane, from about 20 to about 75 parts of mineral oil and from about 10 to about 47 parts of coupling agent, all parts expressed on a weight basis.

4,231,987
METHOD OF STRIPPING A MOLDED ARTICLE

Masayuki Osawa, and Masaoki Sekine, both of Saku, Japan, assignors to TDK Electronics Company Limited, Tokyo, Japan

Filed Jul. 17, 1978, Ser. No. 925,526
Claims priority, application Japan, Oct. 28, 1977, 52/129457
Int. Cl.² B29F *1/14*
U.S. Cl. 264—328.1 **1 Claim**

1. A molding method comprising the steps of:

contacting a stationary mold with a movable mold to form a mold cavity, said mold cavity having at least one push pin extending therein by a slight distance;

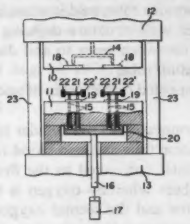
filling said mold cavity with molten resin to form a molded product;

separating said stationary and movable molds;

extending said at least one push pin to separate said molded product from said core;

holding said separated molded product by said at least one push pin;

moving a pair of oppositely oriented guide rails having shaped sections adjacent said molded products being held by said at least one pin; and

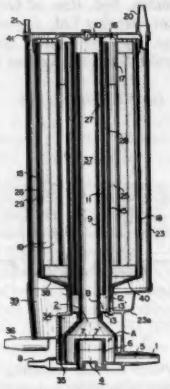


retracting said at least one pin to release said molded product from said at least one pin whereby said molded product may be guided by said pair of guide rails.

4,231,988
ARTIFICIAL LUNG

Motoji Kurata, Hiroshima, Japan, assignor to Japan Medical Supply Co., Ltd., Hiroshima, Japan

Filed Jun. 14, 1979, Ser. No. 48,447
Claims priority, application Japan, Jun. 13, 1978, 53/70328
Int. Cl.³ A61M *1/03*
U.S. Cl. 422—47 **4 Claims**



1. An artificial lung comprising:

a blood reservoir tube having top and bottom walls formed thereon;

a first impervious oxygenation tube disposed coaxially with said blood reservoir tube within the same, said first oxygenation tube terminating adjacent to but spaced from the top wall;

a second impervious oxygenation tube disposed coaxially with said blood reservoir tube between said first oxygenation tube and said blood reservoir tube defining a first annular space, said second oxygenation tube being fixedly secured to the top wall and terminating adjacent to but spaced from the bottom wall;

a third impervious oxygenation tube disposed coaxially with said blood reservoir tube between said second oxygenation tube and said blood reservoir tube defining second and third annular spaces, said third oxygenation tube being fixedly secured to the bottom wall and terminating adjacent to but spaced from the top wall;

an innermost wall structure defining a first oxygen chamber therein open to and disposed under said first oxygenation tube;

an intermediate wall structure connected to the lower end of said first oxygenation tube;

an outer wall structure fixedly secured to the bottom wall of said blood reservoir tube, said intermediate wall structure and said outer wall structure defining a second oxygen chamber therebetween open to and disposed below said third oxygenation tube;

a blood inlet connected to the inside of said first oxygenation tube;

a blood outlet connected to the annular space between said third oxygenation tube and said blood reservoir tube; and

an oxygen gas inlet connected to the first and the second oxygen chambers whereby oxygen is blown into blood through the first and the second oxygen chambers while blood is passing through the annular spaces between said oxygenation tubes.

4,231,989

MULTICHANNEL SYSTEM FOR THE HANDLING OF IMMOBILIZED BIOLOGICALLY ACTIVE SUBSTANCES

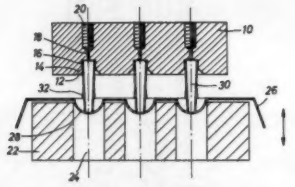
Hans A. Thoma, Munich, Fed. Rep. of Germany, assignor to Chandon Investment Planning Ltd., Cayman Island

Filed Apr. 24, 1978, Ser. No. 899,710

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1977, 2719234

Int. Cl.[2] G01N *1/14*

U.S. Cl. 422—63 **10 Claims**



1. Multichannel system for the handling of solid immobilized, biologically active substances comprising:

a horizontally arranged receiving plate loosely carrying a plurality of sample tubes open at both ends in a regular arrangement, said tubes containing solid immobilized biologically active substances;

an adapter plate with a plurality of holders arranged above the receiving plate, said adapter plate coming into communication with the sample tubes by means of clamping engagement with said holders when the receiving plate and the adapter plate are moved together at a suitable distance with respect to each other;

a plurality of channels, in the adapter plate connected to one holder and of narrow configuration when compared with the holder;

a multichannel displacer pump, working alternatively as suction pump or pressure pump, said pump connected to said channels;

a carrier plate having a plurality of recesses for holding samples to be analyzed each of said recesses positioned to correspond to one of the sample tubes, said carrier plate being exchangeable with said receiving plate;

means for exchanging said receiving plate with said carrier plate.

4,231,990

APPARATUS FOR THE TREATMENT OF FLUIDS

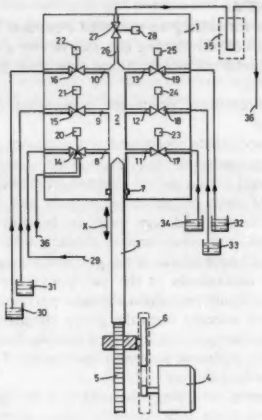
Christian F. Jottier, Herfelingen, Belgium, assignor to S.A. Anarec, Brussels, Belgium

Filed Aug. 21, 1978, Ser. No. 935,293

Claims priority, application Belgium, Aug. 31, 1977, 0180559

Int. Cl.[3] G01N *1/14, 1/16*

U.S. Cl. 422—100 **9 Claims**



1. An apparatus for the treatment of fluids comprising a single air-tight chamber having a variable inner volume, in which at least two fluids may be introduced and treated and from which the fluids may be removed after treatment, a reciprocable piston which tightly closes one end of said chamber, at least two inlet pipes or ducts connected at one end to said chamber and at the other end to a fluid source, a valve being inserted in each of said inlet pipes or ducts near the end thereof connected to said chamber, an outlet pipe equipped with a valve near the end thereof connected to said chamber, means for moving the reciprocable piston and means for selectively opening and closing the valves inserted in said inlet and outlet pipes, a predetermined amount of each fluid being selectively introduced into said chamber via said selectively opened valves inserted in said inlet pipes or ducts by means of a depression or suction created in said chamber, said moving means being operable to move said piston along a predetermined stroke in a direction causing an increase in the inner volume of said chamber to create said suction, the treatment of the fluids in the chamber being effected when all the valves inserted in the inlet and outlet pipes are closed, and the removal of the treated fluids from the treatment chamber being effected via said selectively opened valve inserted in said outlet pipe by the pressure created in said chamber by the piston when the latter is moved in an opposite direction causing such a decrease of the inner volume of the chamber that said inner volume is entirely occupied by the piston.

4,231,991

APPARATUS FOR CRYSTALLIZING AN AMORPHOUS PARTICULATE MATERIAL

Dieter Müller, Sickte, Fed. Rep. of Germany, assignor to Buehler-Miag GmbH, Brunswick, Fed. Rep. of Germany

Filed Sep. 14, 1977, Ser. No. 833,335

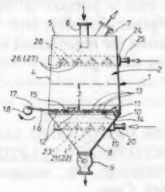
Claims priority, application Fed. Rep. of Germany, Sep. 18, 1976, 2642102

Int. Cl.[3] B01D *9/00*

U.S. Cl. 422—245 **3 Claims**

1. A device for homogeneously crystallizing a continuous flow of an amorphorous gravity fed substance which is in particle form, such as granular polyester and the like, by di-

rectly subjecting the substance to a counterflow of hot gas and thereby heating the substance to a transition temperature at which the substance undergoes a transformation to a crystalline state in a crystallizing zone in which clumps are formed, and by grinding such clumps after their formation to produce a continuous flow of crystallized substance in ground-up form, comprising: a vertically elongated hollow housing with a top, a bottom, a feed port, an outlet port, a hot gas intake, a cool gas intake, a gas exhaust, and an interior, the feed port being located at the top of the housing to permit an amorphorous substance to enter the interior of the housing under the influence of gravity, the outlet port being located at the bottom of the housing to permit the substance to be withdrawn from the interior of the housing under the influence of gravity after crystallization, with the path traversed between the ports by the substance defining a processing flow path extending downwardly through the interior of the housing and passing through a zone thereof which is a crystallization zone having an upper boundry and a lower boundry, which is located intermediate the ports, the hot gas intake being attached to the housing intermediate the crystallization zone and the outlet port, the cool gas intake being attached to the housing intermediate the crystallization zone and the feed port, and the gas exhaust being located on the top of the housing adjacent the feed port, whereby a hot gas flow path and a cool gas flow path are



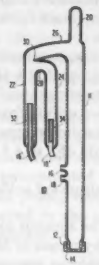
defined, the hot gas flow path passing entirely through the crystallization zone from the hot gas intake to the gas exhaust and the cool gas flow path passing from the cool gas intake to the exhaust entirely above the crystallization zone, the gas flow paths extending upwardly through the interior of the housing in a direction opposed to the direction of the processing flow path and in directly subjected counterflow thereto; a cool gas distributor communicating with the cool gas intake and located within the housing intermediate the crystallization zone and the feed port, the cool gas distributor operating in a manner that cool gas entering the cool gas intake is distributed uniformly within the interior of the housing; and grinding means located within the housing above the hot gas distributor and adjoining only the lower boundry of the crystallization zone and operating in such a manner as to grind clumps formed therein and wherein the grinding means includes at least one perforated plate transversely intersecting the entire flow path and wherein the grinding means includes two horizontal perforated plates which are parallel to each other in vertically separated planes and movable with respect to one another and wherein one plate is fixed and another plate is moveable in its plane and wherein the housing extending outwardly and downwardly intermediate the feed port and the grinding means, and has a maximal cross-sectional area at the location of the grinding means.

4,231,992

THREE-PHASE COUNTER-DOUBLE-CURRENT APPARATUS

William W. Gorman, Jr., and Esther M. Gorman, both of St. Petersburg, Fla., assignors to E-C Apparatus Corporation, St. Petersburg, Fla.

Filed Aug. 14, 1979, Ser. No. 66,362
Int. Cl.³ B01D *11/04*
U.S. Cl. 422—258 **10 Claims**



1. A tube element adapted for interconnection in a rotatable array of such elements to implement mixing and subsequent separation of three at least semi-immiscible liquids into light, intermediate and heavy phases, comprising in combination:

(a) an elongated hollow mixing tube closed at a lower end;

(b) a first elongated hollow decanting tube shorter than said mixing tube and disposed spaced from and parallel to said mixing tube with upper ends of said mixing tube and said first decanting tube at substantially the same level;

(c) a first fluid communicating juncture tube coupling the upper ends of the mixing and decanting tubes;

(d) a second elongated hollow decanting tube shorter than said mixing tube and disposed between said first decanting tube and said mixing tube;

(e) a second fluid communicating juncture tube coupling the upper end of said second decanting tube to said first decanting tube at the juncture between said first decanting tube and said first juncture tube;

(f) a first elongated downspout tube, sealingly mounted in the lower end of said first decanting tube and extending upwards therein a first predetermined distance for defining the volume of the lower and intermediate phases;

(g) a second elongated downspout tube sealingly mounted in the lower end of said second decanting tube and extending upwards therein a second predetermined distance for defining the volume of the lower phase;

(h) a first transfer tube coupled at one end to said first downspout tube and adapted to be coupled at its other end to a lower portion of a mixing tube of a tube element on one side in the array; and

(i) a second transfer tube coupled at one end to said second downspout tube and adapted to be coupled at its other end to a lower portion of a mixing tube of a tube element on another, opposite side in the array.

4,231,993

RECOVERY OF METAL VALUES FROM LEAD SMELTER MATTE

Richard G. Sandberg, and Terry L. Hebble, both of Rolla, Mo., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Jun. 11, 1979, Ser. No. 47,541
Int. Cl.³ C01G *3/12, 21/20, 45/02, 53/11*
U.S. Cl. 423—34 **20 Claims**

1. A method of recovering metal values from lead smelter matte containing cobalt, nickel, copper, iron and arsenic which comprises the steps of:

(a) mixing finely divided lead smelter matte, maganese (III)

or manganese (IV) oxide and sulfuric acid to form an aqueous solution having a pH of not more than 3.5 and containing cobalt, nickel, copper, iron, arsenic and manganese sulfates and an insoluble solids residue containing sulfur and lead sulfate;

(b) separating the insoluble solids residue and the aqueous solution;

(c) adjusting the pH of the separated aqueous sulfate solution from step (b) to 3.5 to 4.5 to precipitate ferric iron and arsenic and further adjusting the pH of the solution to a pH of about 3.0 to redissolve coprecipitated copper;

(d) separating the precipitated ferric iron and arsenic from the aqueous solution;

(e) mixing the separated aqueous solution from step (d) with a sulfide precipitating agent at a pH of not more than 3 to selectively precipitate copper sulfide;

(f) separating the copper sulfide from the aqueous solution;

(g) mixing the aqueous solution separated by step (f) with a sulfiding agent at a pH of 3 to 4.5 to form a cobalt-nickel sulfide precipitate;

(h) separating the cobalt-nickel sulfide precipitate from the aqueous solution;

(i) adjusting the pH of the aqueous solution separated by step (h) to a pH of 3 to 7 by means of MgO, NaOH or Na_2CO_3 to form a slurry containing manganese sulfate;

(j) reacting the slurry containing manganese sulfate with oxygen at a temperature of 25° to 75° C. to form a manganese-containing precipitate selected from the group consisting of manganese hydroxide and manganese carbonate;

(k) separating the manganese-containing precipitate from the aqueous solution;

(l) heating the manganese-containing precipitate of step (j) to produce manganese oxide;

(m) returning at least a portion of the separated aqueous solution of step (k) to step (a) to provide sulfuric acid for mixing with said lead smelter matte and said manganese oxide; and

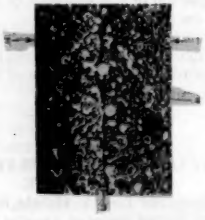
(n) returning at least a portion of the manganese oxide produced by step (l) to step (a) to provide manganese oxide for mixing with said sulfuric acid and said lead smelter matte.

4,231,994

SEPARATION OF ZIRCONIUM FROM HAFNIUM BY SOLVENT EXTRACTION

David J. MacDonald, Reno, Nev., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Aug. 27, 1979, Ser. No. 69,677
Int. Cl.³ C01G *25/00, 27/00*
U.S. Cl. 423—70 **4 Claims**



1. In a process for separation of zirconium from hafnium by solvent extraction of an aqueous sulfuric acid feed solution containing the metals with an organic extractant comprising a solution of a high molecular weight tertiary amine in an organic solvent and separation of the organic and aqueous phases, the improvement comprising adding to the feed solution prior to extraction about 0.5 to 10 moles per mole of zirconium in the feed solution of a water-soluble and organic solvent-insoluble α-hydroxycarboxylic acid.

4,231,995

AMMONIA DOUBLE-ALKALI PROCESS FOR REMOVING SULFUR OXIDES FROM STACK GASES

Ivor E. Campbell, New Albany, Ohio; James M. Henderson, New Brunswick, N.J.; Walter Johnson, El Paso, Tex., and William H. Wetherill, Staten Island, N.Y., assignors to Smelter Control Research Association, Inc., New York, N.Y.

Filed Sep. 22, 1978, Ser. No. 944,797
Int. Cl.³ C01B *17/00*
U.S. Cl. 423—242 **11 Claims**

1. A process for removing sulfur oxide from stack gases comprising:

(a) contacting said stack gases with an aqueous wash liquid comprising ammonium sulfite as a sulfur oxide reactive compound to form a spent absorbent liquor containing bisulfite, sulfite and sulfate salts of ammonia;

(b) regenerating at least a portion of the reactive compound and precipitating calcium sulfite solids by treating the spent absorbent liquor with a source of calcium ions, the calcium ion concentration of the regenerated liquor being maintained between about 500 and 800 ppm at substantially all times and the pH of the regenerated liquor being maintained between about 5.5 and 6.2 at substantially all times whereby any gypsum solids precipitation in the process is tolerated for a time insufficient to degrade substantially process performance;

(c) separating the precipitated calcium solids from the regenerated liquor;

(d) returning at least a portion of the separated calcium solids to the regeneration step; and

(e) further contacting the regenerated liquor with said sulfur oxide containing stack gases.

4,231,996

METHOD FOR PRODUCING AMMONIA AND HYDROGEN SULFIDE

Metro D. Kulik, Pittsburgh, Pa., assignor to Continental Oil Company, Stamford, Conn.

Continuation-in-part of Ser. No. 966,686, Dec. 5, 1978, abandoned. This application Jun. 20, 1979, Ser. No. 50,239
Int. Cl.³ C01B *17/04*
U.S. Cl. 423—242 **1 Claim**

1. In a process for removing sulfur oxides from a gaseous mixture, said process consisting essentially of:

(a) contacting said gaseous mixture with a first aqueous solution containing $(NH_4)_2S_2O_3$ and at least one alkaline compound selected from the group consisting of $NH_3$and NH_4OH to remove said sulfur oxides from said gaseous mixture and produce a second aqueous solution containing at least one compound selected from the group consisting of $(NH_4)_2S_2O_3$, $(NH_4)_2SO_3$ and $(NH_4)HSO_3$;

(b) withdrawing a first portion of said second aqueous stream and passing said first portion to sulfur recovery;

(c) adding at least one alkaline compound selected from the group consisting of NH_3 and NH_4OH and at least one sulfide compound selected from the group consisting of H_2S, NH_4HS and $(NH_4)_2S$ to a second portion of said second aqueous stream to produce said first aqueous solution, said alkaline compound and said sulfide compound being added in a molar ratio (NH_3/H_2S) from about 2.8 to about 3.2;

(d) contacting said first portion of said second aqueous stream with H_2S to convert at least a portion said $(NH_4)_2S_2O_3$, $(NH_4)_2SO_3$ and $(NH_4)HSO_3$ to ammonium polysulfide, thereby producing an aqueous ammonium polysulfide stream; and

(e) heating said aqueous ammonium polysulfide stream to decompose said ammonium polysulfide and produce NH_3, H_2S and sulfur,

the improvement comprising adjusting the concentration of ammonium thiosulfate in said first portion to form about 25 to about 35 weight percent ammonium thiosulfate, contacting said first portion with H_2S at a pressure from about 100 to about 300 psig at a temperature from about 125° to about 182° C. to react at least about 70 percent of said ammouium thiosulfate thereby producing an aqueous product solution containing at least 0.085 g mols of ammonium thiosulfate per liter of solution and ammonium polysulfide which, upon decomposition produces a gaseous mixture of NH_3 and H_2S in a molar ratio (NH_3/H_2S from about 2.8 to about 3.2 and sulfur and recycling said gaseous mixture to step (c).

4,231,997

PREPARATION OF RARE EARTH NITRATES

Frank Pitts, Magalas, France, assignor to Engelhard Minerals & Chemicals Corporation, Menlo Park, N.J.

Filed Apr. 5, 1979, Ser. No. 27,530
Int. Cl.³ C01F *17/00*
U.S. Cl. 423—263 **6 Claims**

1. In a process for preparing a rare earth nitrate solution from a rare earth hydroxide containing quadrivalent cerium by dissolving said rare earth hydroxide in nitric acid solution in the presence of a reducing agent to prevent formation of quadrivalent cerium ions in the nitrate solution, the improvement which comprises causing said rare earth hydroxide containing quadrivalent cerium to react with said nitric acid in the presence of a solution of hydrogen peroxide as the reducing agent, said solution of hydrogen peroxide and said rare earth hydroxide being incorporated with said nitric acid in a manner such as to maintain the EMF of the solution below 900 millivolts when EMF is measured between a platinum electrode and a normal calomel electrode and to produce a rare earth nitrate solution which contains trivalent cerium ions and has a pH above 1 and not to exceed 3.5.

4,231,998

METHOD FOR SEPARATING CARBON BLACK FROM FIBERGLASS

Manuel M. Gutierrez, Westminster, Colo., assignor to Tosco Corporation, Los Angeles, Calif.

Filed Aug. 31, 1978, Ser. No. 938,486
Int. Cl.³ C01B *31/02*; C09C *1/48*
U.S. Cl. 423—449 **4 Claims**

1. In a process for pyrolyzing and grinding rubber containing polymeric hydrocarbons, carbon black and fiberglass which yields a product comprising a mat of fiberglass strands containing carbon black trapped in the interstices thereof, and separating the product into useful carbon black and fiberglass wherein the improvement comprises the steps of:

(a) passing the mat through an agitating member to at least partially break said mat into a cloud of fiberglass particles and free carbon black particles;

(b) passing an airstream through said cloud of sufficient velocity to pick up and carry off free carbon black particles and substantially carbon free fiberglass particles and not pick up and carry off fiberglass particles carrying carbon black in combination therewith;

(c) separating said free carbon black particles from said substantially carbon black free fiberglass particles;

(d) collecting said separated free carbon black particles as a first useful by-product; and,

(e) combusting said separated fiberglass particles to remove any remaining carbon black carried thereby to form carbon black free fiberglass particles as a second useful by-product.

4,231,999

METHOD IN ASSAYING METHODS INVOLVING BIOSPECIFIC AFFINITY REACTIONS AND REAGENT FOR USE IN SAID METHOD

Jan P. E. Carlsson, Uppsala; Rolf E. A. V. Axén, Bälinge, and Håkan N. Y. Drevin, Brunna, all of Sweden, assignors to Pharmacia Diagnostics AB, Uppsala, Sweden

Filed Mar. 2, 1978, Ser. No. 882,678
Int. Cl.² G01N *33/16*; A61K *43/00*
U.S. Cl. 424—1 **20 Claims**

1. In the known method of carrying out assaying methods involving biospecific affinity reactions, in which there is used a component (I) which is labelled with at least one analytically indicatable group and is soluble in the liquid in whose presence the biospecific affinity reaction is carried out, for reaction with a counterpart (II) which exhibits biospecific affinity to (I) or with said counterpart (II) and also one or more additional counterparts exhibiting biospecific affinity to at least one of (I) and (II) and forming an insoluble conjugate in which the labelled component (I) is incorporated and which conjugate is separated from the liquid phase, whereafter the analytically indicatable group is assayed in the insoluble conjugate, the improvement which comprises

(A)

(a) using as the analytically indicatable group one which is bound to the component (I) with a splittable bond of covalent nature, or

(b) using as one of said counterparts a counterpart which is bound to a carrier, which is insoluble in said liquid, with a splittable bond of covalent nature, or

(c) using as the analytically indicatable group one which is bound to the component (I) with a splittable bond of covalent nature and using as one of said counterparts a counterpart which is bound to a carrier, which is insoluble in said liquid, with a splittable bond of covalent nature, said splittable bonds, which can be the same or different, being splittable under conditions which have practically no disturbing influence on the assay method used; and

(B) splitting the insoluble conjugate at said splittable bond or bonds, in the presence of a liquid, to form fragments which are soluble in said liquid and which contain the analytically indicatable group, which group is then assayed in the liquid phase.

4,232,000

RADIOACTIVE SCANNING AGENTS WITH STABILIZER

Mahdi B. Fawzi, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jun. 28, 1978, Ser. No. 920,082
Int. Cl.² A61K *29/00, 43/00*
U.S. Cl. 424—1 **22 Claims**

18. A composition useful in the preparation of technetium-99 m-based radiographic scanning agents, comprising: an oxidized pertechnetate solution having dissolved therein a stabilizing amount of a gentisol stabilizer selected from gentisyl alcohol or a pharmaceutically-acceptable salt or ester thereof.

4,232,001

METHODS AND MATERIALS FOR DETECTION OF ESTROPHILIN

Elwood V. Jensen, and Eugene R. DeSombre, both of Chicago, Ill., assignors to University Patents, Inc., Norwalk, Conn.

Filed Sep. 22, 1978, Ser. No. 945,000
Int. Cl.² G01N *33/16*; A61K *43/00*
U.S. Cl. 424—1 **8 Claims**

1. A specific, immunologically active anti-estrophilin antibody obtained as a serum immunoglobulin component from an animal immunized with estrophilin, and characterized by its donation to the immunoglobulin of the following properties;

(1) the ability to precipitate estrophilin from a mixture of estrophilin and said immunoglobulin upon addition of

heterologous species antibodies to the immunoglobulin of the serum donor species;
(2) the ability to mediate rapid absorption of estrophilin from a fluid by support polymer when said immunoglobulin is linked to the support polymer;
(3) the ability of said immunoglobulin to mediate absorption of estrophilin from a fluid by *S. aureus* protein-A linked to a support polymer;
(4) the ability of said immunoglobulin to increase the sedimentation rate of estrophilin; and,
(5) the ability of said immunoglobulin to modify elution characteristics of estrophilin on gel filtration.

4,232,002

PROCEDURES AND PHARMACEUTICAL PRODUCTS FOR USE IN THE ADMINISTRATION OF ANTIHISTAMINES

Stephen G. Nogrady, Sully, near Penarth, Great Britain, assignor to The Welsh National School of Medicine, Penarth, Great Britain

Filed Nov. 30, 1978, Ser. No. 965,171

Claims priority, application United Kingdom, Dec. 1, 1977, 50020

Int. Cl.[2] A61L *9/04*; A61K *9/04, 31/44*

U.S. Cl. 424—45 **5 Claims**

1. A method for the treatment or prophylaxis of reversible airways obstruction in human patients, comprising administering by inhalation to a said patient a therapeutically or prophylactically effective amount of a member selected from the group consisting of clemastine, chlorpheniramine, ketotifen, brompheniramine, and a pharmaceutically acceptable salt thereof, said amount being effective for the treatment or prophylaxis of reversible airways obstruction.

4,232,003

SYNTHETIC PHYSIOLOGICAL MUCUS

Albert E. Posthuma, 3520 Burton Ridge, Apt. D, Grand Rapids, Mich. 49506, and Robert C. Woodhouse, 1664 Alexander, S.E., Grand Rapids, Mich. 49506

Continuation-in-part of Ser. No. 470,522, May 16, 1974, abandoned, which is a continuation-in-part of Ser. No. 332,933, Feb. 16, 1973, abandoned. This application Nov. 26, 1975, Ser. No. 635,436

Int. Cl.[3] A61K *31/78*

U.S. Cl. 424—81 **7 Claims**

1. A method of treating vaginal areas deficient in natural mucus, comprising the steps of:
supplying a pituitous aqueous solution consisting essentially of about 0.3 to about 1.5 grams of polyacrylamide polymer per 100 cc of water, said polyacrylamide polymer having a molecular weight of at least about 3,000,000 and said solution having a pH in the range of about 3 to 10; and
applying said solution to vaginal areas to form a stainless, odorless, nontoxic coating having lubricity, pituitousness and clingyness characteristics resembling those of natural vaginal mucus.

4,232,004

ANTIBODY-SPECIFIC SOLID PHASE IMMUNOADSORBENT, PREPARATION THEREOF, AND ANTIBODY PURIFICATION THEREWITH

Roger Y. Dodd, Bethesda, Md., assignor to American National Red Cross, Washington, D.C.

Filed Sep. 21, 1977, Ser. No. 835,307

Int. Cl.[3] A61K *39/29, 39/12*

U.S. Cl. 424—89 **14 Claims**

1. A solid phase immunoadsorbent for use in the isolation and purification of a specific antibody from a preparation containing said antibody, said immunoadsorbent consisting essentially of a particulate porous glass carrier having an average pore diameter within the range of about 40–200 nm, said porous glass carrier being, within the pH range of about 2–8, capable of selectively and stably binding lipid containing materials, and a lipid containing viral antigen specific to said specific antibody adsorptively bound directly to said carrier surface.

4,232,005

ANTIBACTERIAL AGENTS

Thomas T. Howarth, Ewhurst, England, assignor to Beecham Group Limited, England

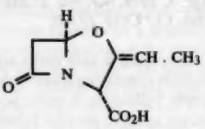
Division of Ser. No. 669,697, Mar. 23, 1976. This application Dec. 5, 1977, Ser. No. 857,112

Claims priority, application United Kingdom, Apr. 14, 1975, 15209/75; Sep. 27, 1975, 39663/75

Int. Cl.[3] H61K *35/00*

U.S. Cl. 424—114 **19 Claims**

12. A method of treating bacterial infections in humans and animals which comprises administering to a human or animal in need thereof a synergistically effective amount of a compound of the formula (III):



(III)

or a pharmaceutically acceptable salt thereof and a antibacterially effective amount of amoxycillin or a pharmaceutically acceptable salt thereof in a weight ratio of 20:1 to 1:5.

4,232,006

ANTIBIOTIC W-10 COMPLEX, ANTIBIOTIC 20561 AND ANTIBIOTIC 20562 AS ANTIFUNGAL AGENTS

David Taplin, Miami, Fla.; Marvin J. Weinstein, East Brunswick, N.J.; Raymond T. Testa, Verona, N.J.; Joseph A. Marquez, Montclair, N.J., and Mahesh G. Patel, Verona, N.J., assignors to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 767,102, Feb. 2, 1977, Pat. No. 4,137,224. This application Oct. 19, 1978, Ser. No. 953,051

Int. Cl.[3] C07C *103/52*; A61K *37/00, 31/71*; C07H *17/00*

U.S. Cl. 424—177 **4 Claims**

1. A method of eliciting an antifungal effect in a mammal having a fungal infection which comprises administering to said mammal a therapeutically effective quantity of a composition of matter selected from the group consisting of Antibiotic W-10 Complex, Antibiotic 20561 and Antibiotic 20562.

3. A method according to claim 1 which comprises administering to said mammal a therapeutically effective quantity of Antibiotic 20561.

4,232,007

ORAL ANTILIPEMIC AGENTS

Motoyoshi Kajihara; Toshihiro Hamakawa, both of Naruto; Toshiaki Shibata, Tokushima; Takashi Suzue, Naruto, and Setsuro Fujii, Tokushima, all of Japan, assignors to Taiho Pharmaceutical Company Ltd., Tokyo, Japan

Filed Jul. 12, 1976, Ser. No. 704,933

Claims priority, application United Kingdom, Aug. 26, 1975, 35250/75

Int. Cl.[3] A61K *37/00*

U.S. Cl. 424—177 **1 Claim**

1. A therapeutic method for reducing lipids in blood which comprises administering an antilipemically effective amount of the oral antilipemic agent comprising a pharmaceutically effective amount of at least one acidic polyamino acid having a molecular weight of 10,000 to 100,000 and pharmaceutically acceptable salts thereof, and an adjuvant to a patient affected with hyperlipidemia.

4,232,008
TETRAPEPTIDES AND METHODS

Gideon Goldstein, Short Hills, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.

Continuation-in-part of Ser. No. 940,531, Sep. 8, 1978, abandoned, which is a continuation-in-part of Ser. No. 858,496, Dec. 8, 1977, abandoned. This application Nov. 17, 1978, Ser. No. 960,550

Int. Cl.[2] **A61K** *37/00;* **C07C** *103/52*

U.S. Cl. 424—177 **37 Claims**

1. A polypeptide having the capability of inducing the differentiation of both Th-1+ T-lymphocytes and Bu-1+ B-lymphocytes, said polypeptide having the following sequence:

R—X—LYS—Y—GLN—R'

wherein X and Y are each natural and non-natural amino acid residues selected from the group consisting of L-asparagyl, L-glutamyl, L-threonyl, glycyl, L-valyl, L-leucyl, L-alanyl, L-seryl, sarcosyl, 2-methylalanyl, D-asparagyl, D-glutamyl, D-threonyl, D-valyl, D-leucyl, D-alanyl, and D-seryl and R and R' are each selected from the groups consisting of:

R	R'
Hydrogen	OH
C_1–C_7 alkyl	NH_2
C_6–C_{12} aryl	NHR_7
C_6–C_{20} alkaryl	$N(R_7)_2$
C_6–C_{20} aralkyl	OR_7
C_2–C_7 alkanoyl	
C_2–C_7 alkenyl	GLY
C_1–C_7 alkynyl	GLY-GLY
GLN	
SAR	GLY—GLY—SER—ASN

wherein R_7 is C_1–C_7 alkyl, C_2–C_7 alkenyl, C_2–C_7 alkynyl, C_6–C_{20} aryl, C_6–C_{20} aralkyl, and C_6–C_{20} alkaryl, provided that when R is GLN, R' is other than GLY—GLY—SER—ASN, and the pharmaceutically acceptable salts thereof; further provided that said polypeptide induce the differentiation of both Th-1+ T-lymphocytes and Bu-1+ B-lymphocytes in the chicken induction assay at a concentration of about one ng/ml or less.

4,232,009
ω-HALO-PGI$_2$ ANALOGUES

Masaki Hayashi, Takatsuki; Yoshinobu Arai, Toyonaka; Shuichi Ohuchida, Kyoto, and Shinsuke Hashimoto, Nishinomiya, all of Japan, assignors to ONO Pharmaceutical Co. Ltd., Osaka, Japan

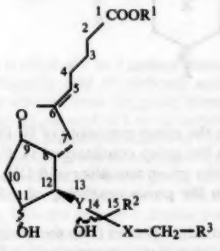
Filed Feb. 22, 1979, Ser. No. 14,082

Claims priority, application Japan, Mar. 1, 1978, 53/022150

Int. Cl.[3] **A61K** *31/70, 31/58;* **C07D** *307/935*

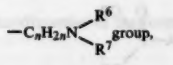
U.S. Cl. 424—180 **19 Claims**

1. A prostaglandin I_2 analogue of the formula:

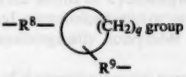


II

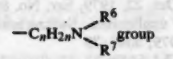
wherein Y represents ethylene or trans-vinylene, R^1 represents a hydrogen atom, a straight- or branched-chain alkyl group containing from 1 to 12 carbon atoms, an aralkyl group containing from 7 to 12 carbon atoms, a cycloalkyl group containing from 4 to 7 carbon atoms unsubstituted or substituted by at least one straight- or branched-chain alkyl group containing from 1 to 4 carbon atoms, a phenyl group unsubstituted or substituted by at least one chlorine atom, trifluoromethyl group, straight- or branched-chain alkyl group containing from 1 to 4 carbon atoms or phenyl group, a $-C_mH_{2m}COOR^4$ group, wherein m represents an integer of from 1 to 12 and R^4 represents a straight- or branched-chain alkyl group containing from 1 to 4 carbon atoms, a $-C_nH_{2n}OR^5$ group, wherein n represents an integer of from 2 to 12 and R^5 represents a hydrogen atom or a straight- or branched-chain alkyl group containing from 1 to 4 carbon atoms, or a



wherein n is as hereinbefore defined and R^6 and R^7, which may be the same or different, each represent a straight- or branched-chain alkyl group containing from 1 to 4 carbon atoms, R^2 represents a hydrogen atom or a methyl or ethyl group, X represents a straight or branched chain $-C_pH_{2p}-$ group, wherein p represents an integer of from 2 to 8, or a

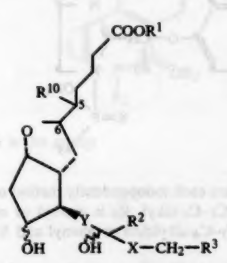


wherein R^8 represents a single bond, or a straight- or branched-chain alkylene group containing from 1 to 4 carbon atoms, R^9 represents a single bond or a straight- or branched-chain alkylene group containing from 1 to 8 carbon atoms, and q represents an integer of from 3 to 6, R^3 represents a chlorine or fluorine atom, the wavy line attached to the carbon atoms in positions 11 and 15 represents α- or β-configuration or mixtures thereof, and the double bond between C_5–C_6 is in the Z configuration, cyclodextrin clathrates thereof, and, when R^1 represents a hydrogen atom, non-toxic salts thereof and, when R^1 represents a



in which n, R^6 and R^7 are as hereinbefore defined, non-toxic acid addition salts thereof.

19. A compound of the formula:



III

wherein R^{10} represents a bromine or iodine atom and the other symbols are as defined in claim **1.**

4,232,010
CALCIUM-ANTAGONISTIC COMPOSITION

Goro Tsukamoto, Toyonaka; Koichiro Yoshino, Osaka; Tominori Morita, Nishinomiya; Takashi Nose, Suita, and Mitsuo Okazaki, Tama, all of Japan, assignors to Kanebo, Ltd., Tokyo, Japan

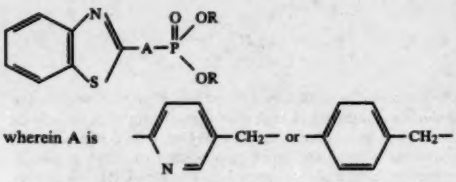
Filed May 14, 1979, Ser. No. 39,311

Claims priority, application Japan, May 15, 1978, 53-58021; Feb. 8, 1979, 54-14516; Feb. 8, 1979, 54-14517

Int. Cl.[3] A01N *57/28*; C07F *9/28*; C07D *277/66*, *417/02*

U.S. Cl. 424—200 12 Claims

1. A calcium-antagonistic pharmaceutical composition comprising a therapeutically effective amount of a phosphonate of the formula:



wherein A is

and R is C_1–C_4 alkyl, in combination with a pharmaceutically acceptable, non-toxic inert carrier.

4,232,011
1-PHOSPHORYLATED 2-(PHENOXYALKYL)-2-IMIDAZOLINE DERIVATIVES AND THEIR USE IN PEST CONTROL

Manfred Böger, Weil am Rhein, Fed. Rep. of Germany; Jozef Drabek, Oberwil, Switzerland; Günter Mattern, Liestal, Switzerland, and Walter Traber, Reinach, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

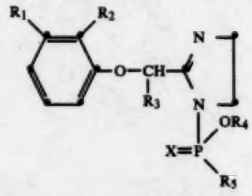
Filed Oct. 22, 1979, Ser. No. 86,888

Claims priority, application Switzerland, Nov. 2, 1978, 11291/78; Jun. 8, 1979, 5367/79

Int. Cl.[3] A01N *57/32*; C07F *9/65*

U.S. Cl. 424—200 12 Claims

1. A compound of the formula I



(I)

wherein R_1 and R_2 are each independently methyl or chlorine, R_3 is hydrogen or C_1–C_4-alkyl, R_4 is methyl or ethyl, R_5 is methoxy, ethoxy, C_1–C_4-alkylthio or phenyl and X is oxygen or sulphur.

11. A method of controlling pests at a locus, which method comprises applying to said locus a pesticidally effective amount of a compound as claimed in claim 1.

4,232,012
COMPOSITION

Thomas S. C. Orr, Melton Mowbray; David E. Hall, Burton-on-the-Wolds, and John Mann, Long Whatton, all of England, assignors to Fisons Limited, London, England

Division of Ser. No. 863,859, Dec. 23, 1977, Pat. No. 4,151,292, which is a continuation-in-part of Ser. No. 742,750, Nov. 18, 1976, Pat. No. 4,066,756. This application Feb. 15, 1979, Ser. No. 12,327

Claims priority, application United Kingdom, Jan. 25, 1977, 2872/77

Int. Cl.[2] A61K *31/625*

U.S. Cl. 424—232 14 Claims

1. A pharmaceutical composition adapted for oesophageal administration to a mammal comprising, as active ingredient, at least one chromone compound selected from 5-(2-hydroxypropoxy)-8-propyl-chromone-2-carboxylic acid; 6,7,8,9-tetrahydro-4-oxo-10-propyl-4H-naphtho-[2,3,-b]-pyran-2-carboxylic acid; 6,7,8,9-tetrahydro-5-hydroxy-4-oxo-10-propyl-4H-naphtho[2,3,-b]pyran-2-carboxylic acid or a pharmaceutically acceptable salt of any one thereof, in combination with an anti-inflammatory selected from aspirin, indomethacin, and mixtures thereof, said composition containing 0.004 to 1200 parts by weight of said anti-inflammatory per part of said active ingredient.

4,232,013
16,17-PYRAZOLINO- AND 16,17-ISOPYRAZOLINO-1,4-PREGNADIENE DERIVATIVES

Gaetano Palladino, and Mario Micciarelli, both of Milan, Italy, assignors to Lark S.p.A., Milan, Italy

Filed Nov. 30, 1978, Ser. No. 965,058

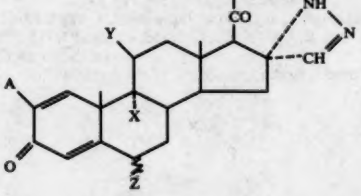
Claims priority, application United Kingdom, Dec. 3, 1977, 50464/77

Int. Cl.[3] A61K *31/58*; C07J *43/00*

U.S. Cl. 424—241 13 Claims

1. A pharmaceutical composition for treating inflammation and rheumatism comprising

a pharmaceutically effective amount of a compound of the formula:



wherein

A is selected from the group consisting of H, Br, and Cl;

X is selected from the group consisting of H, F, or Cl;

Y is selected from the group consisting of β-OH, keto, or Cl;

Z is selected from the group consisting of α-F, β-F, and α-CH_3; and

R is H or an acyl residue selected from the group consisting of a mono- or dicarboxylic organic acid having 2 to 8 carbon atoms, methasulfobenzoic acid, and phosphoric acid, admixed with a pharmaceutically acceptable carrier for topical, intraarticular, and systemic administration.

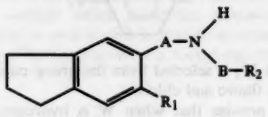
4,232,014

AMINOALKYLINDANS AND USE AS HYPOTENSIVE AGENTS

Ian W. Mathison, Big Rapids, Mich., and William E. Solomons, Martin, Tenn., assignors to Marion Laboratories, Inc., Kansas City, Mo.

Filed Jan. 12, 1979, Ser. No. 3,046
Int. Cl.³ A61K *31/165, 31/135;* C07C *103/20, 87/28*
U.S. Cl. 424—324 12 Claims

1. A compound of the formula



wherein A represents an alkylene group having 2 to 5 carbons in a straight chain, R_1 represents a lower alkyl having 1 to 3 carbons or is a lower alkoxy having 1 to 3 carbons, B represents —CH_2— or

and R_2 represents phenyl or phenyl-lower alkyl and the phenyl group in such substituents is unsubstituted or is substituted with 1 to 3 lower alkoxy groups, and acid addition salts of the amines.

11. A method which comprises orally administering a compound as defined in claim 1, or 5-aminoethyl-6-methylindan, to an animal afflicted with high blood pressure in an amount sufficient to lower the animal's blood pressure.

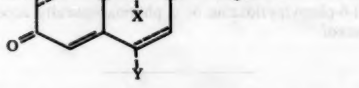
4,232,015

NOVEL Δ^4-ANDROSTENES

Jean G. Teutsch, Pantin, and Roger Deraedt, Les Pavillons-sous-Bois, both of France, assignors to Roussel Uclaf, Paris, France

Filed Aug. 6, 1979, Ser. No. 63,939
Claims priority, application France, Aug. 16, 1978, 78 23851
The portion of the term of this patent subsequent to Sep. 18, 1996, has been disclaimed.
Int. Cl.³ C07J *1/00*
U.S. Cl. 424—243 33 Claims

1. A Δ^4-androstene of the formula



wherein R_1 is alkyl of 1 to 3 carbon atoms, R' is an acyl of an organic carboxylic acid or carbonic acid of 1 to 18 carbon atoms, R_2 is selected from the group consisting of alkyl of 1 to 12 carbon atoms, alkenyl of 2 to 12 carbon atoms, —CF_3, aryl of 6 to 12 carbon atoms and aralkyl of 7 to 12 carbon atoms, Y is selected from the group consisting of hydrogen, fluorine and methyl, X is selected from the group consisting of hydrogen, chlorine, bromine and fluorine and the dotted lines in the A and B rings indicate one or 2 double bonds in 1(2) and 6(7) position with the proviso when R_1 is methyl and the B ring is saturated, X is hydrogen when Y is hydrogen and X is not hydrogen when Y is fluorine.

21. A method of relieving inflammation in warm-blooded animals comprising administering to warm-blooded animals an anti-inflammatorily effective amount of at least one compound of claim 1.

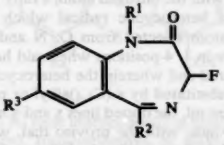
4,232,016

3-FLUOROBENZODIAZEPINES

Eike Poetsch; Jürgen Uhl; Dieter Marx; Wighard Strehlow; Helmut Müller-Calgan, and Giuliano Dolce, all of Darmstadt, Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschraenkter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Dec. 9, 1975, Ser. No. 639,163
Claims priority, application Fed. Rep. of Germany, Dec. 20, 1974, 2460360; Sep. 23, 1975, 2542251
Int. Cl.³ C07D *243/24;* A61K *31/55*
U.S. Cl. 414—244 39 Claims

1. A 3-fluorobenzodiazepine of the formula



wherein R^1 is H, alkyl or fluorinated alkyl of 1–4 carbon atoms and up to 9 fluorine atoms or cycloalkylalkyl of 4–8 carbon atoms; R^2 is phenyl, monohalophenyl or pyridyl; R^3 is F, Cl, Br or NO_2, and physiologically acceptable acid addition salts thereof.

29. A method of depressing central nervous system activity in mammals comprising administering to a patient a daily dosage of a compound of claim 1, in admixture with a pharmaceutically acceptable carrier, effective to induce a muscle-relaxing, anticonvulsive or anxiolytic effect.

4,232,017

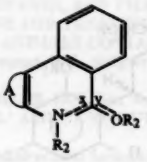
TREATMENT OF PSYCHIC DISORDERS AND INFLAMMATION WITH FUSED ISOQUINOLINES

Giorgio Winters, and Nunzio Di Mola, both of Milan, Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

Filed May 22, 1979, Ser. No. 41,356
Claims priority, application United Kingdom, May 26, 1978, 23106/78
Int. Cl.³ A61K *31/54, 31/47;* C07D *471/04, 513/04*
U.S. Cl. 424—246 9 Claims

1. A tricyclic orthofused heterocyclic compound of the formula

I



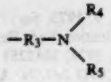
wherein A is the group

(a)

or the group

(b)

in which R represents hydrogen, (C_{1-4})alkyl, phenyl or tolyl and R_1 may be (C_{1-4})alkyl, phenyl or tolyl, R_2 is selected from (C_{1-4})alkyl, (C_{2-4})alkanoylmethyl, carbo- (C_{1-3})alkoxymethyl, hydroxy(C_{2-4})alkyl, halo(C_{2-4})alkyl and a group



wherein R_3 is an alkylene group from 2 to 4 carbon atoms and R_4 and R_5 independently represent hydrogen or (C_{1-4})alkyl or, taken together with the nitrogen atom, a fully hydrogenated 5- or 6-membered heterocyclic radical which may contain a further heteroatom selected from O, N and S wherein the heteroatoms are in 1, 4-positions when said heterocyclic radical is 6-membered and wherein the heterocyclic radicals may be optionally substituted by a (C_{1-4})alkyl or phenyl group, or R_2 may represent nil, the dotted lines x and y may represent nil or additional bonds; with the proviso that, when the symbol R_2 linked to the oxygen atom is different from nil, x is an additional bond and y and the other symbol R_2 represent nil; with the further proviso that, when the symbol R_2 linked to the nitrogen atom is different from nil, y is an additional bond and x and the other symbol R_2 represent nil; or a salt therewith of a pharmaceutically acceptable acid.

9. A method for treating psychic disorders and inflammation in mammals, which comprises administering thereto a daily dosage of a compound of formula I as claimed in claim 1 or a salt therewith of a pharmaceutically acceptable acid in amount varying from about 0.05 to about 2.00 grams.

4,232,018

HEXAHYDRO-1-HYDROXY-9-HYDROXYMETHYL-3-SUBSTITUTED-6H-DIBENZO[B,D]PYRANS AS ANALGESIC AGENTS

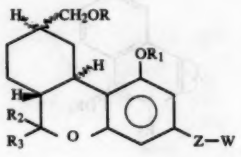
Michael R. Johnson, Gales Ferry, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 952,314, Oct. 18, 1978, which is a continuation-in-part of Ser. No. 934,319, Aug. 16, 1978, abandoned, which is a division of Ser. No. 807,439, Jun. 17, 1977, Pat. No. 4,133,819. This application Mar. 29, 1979, Ser. No. 24,783

Int. Cl.² C07D *413/12*; A61K *31/535*

U.S. Cl. 424—248.55 **10 Claims**

1. A compund selected from the group consisting of those having the formula



wherein

R is selected from the group consisting of hydrogen and alkanoyl having from one to five carbon atoms;

R_1 is —CO—$(CH_2)_p$—NR_4R_5 wherein p is 0 or an integer from 1 to 4; R_4 and R_5 taken together with the nitrogen to which they are attached represent morpholino;

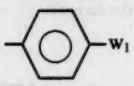
each of R_2 and R_3 is selected from the group consisting of hydrogen and methyl;

Z is selected from the group consisting of

(a) alkylene having from one to ten carbon atoms;

(b) —$(alk_1)_m$—O—$(alk_2)_n$— wherein each of (alk_1) and (alk_2) is alkylene having from one to ten carbon atoms, with the proviso that the summation of carbon atoms in (alk_1) plus (alk_2) is not greater than ten; each of m and n is 0 or 1; and

W is selected from the group consisting of hydrogen and



wherein W_1 is selected from the group consisting of hydrogen, fluoro and chloro;

with the proviso that when W is hydrogen, Z is (alk_1.)$_m$—O—$(alk_2)_n$—;

and the pharmaceutically-acceptable acid addition salts thereof.

10. A composition suitable for producing analgesia in a mammal comprising a compound of claim 1 in association with a pharmaceutical carrier.

4,232,019

METHOD FOR THE TREATMENT OF MALE STERILITY

Jean-Pierre Lomard, Massy, France, assignor to Societe Anonyme dite: CM Industries, Paris, France

Filed Jun. 26, 1979, Ser. No. 52,109

Int. Cl.² A61U *27/00*

U.S. Cl. 424—248.56 **1 Claim**

1. A method for the treatment of male sterility caused by dyspermatogeny, comprising orally administering daily to the sterile male from 100 to 300 mg of 3-morpholinoethylamino-4-methyl-6-phenylpyridazine or a pharmaceutically acceptable salt thereof.

4,232,020

PROCESS FOR THE TREATMENT OF CHILDREN SUFFERING FROM A HYPERKINETIC SYNDROME

Jean-Pierre Lombard, Massy, France, assignor to C M Industries, France

Filed May 1, 1979, Ser. No. 34,970

Int. Cl.² A61K *27/00*

U.S. Cl. 424—248.56 **1 Claim**

1. A method for the treatment of hyperkinetic syndrome in children, comprising orally administering daily to the hyperactive child from 50 mg to 200 mg of 3-morpholinoethylamino-4-methyl-6-phenylpyridazine or a pharmaceutically acceptable salt thereof.

4,232,021

ANTI-DEPRESSANT METHODS

Bruno P. H. Poschel, Ann Arbor, and Donald R. Maxwell, Pinckney, both of Mich., assignors to Kefalas A/S, Copenhagen-Valby, Denmark

Filed Jan. 25, 1979, Ser. No. 6,317

Int. Cl.² A61K *31/495*

U.S. Cl. 424—250 **4 Claims**

1. A method for treating depression in mammals which comprises administering an effective anti-depressant amount of trans-9-[3(4-hydroxyethyl-1-piperazinyl)-propylidene]-2-trifluoromethylthiaxanthene or a pharmaceutically acceptable acid addition salt thereof, essentially free from its cis isomer.

4,232,022
HETEROCYCLIC COMPOUNDS

Roger J. Ponsford, Horsham, England, assignor to Beecham Group Limited, England

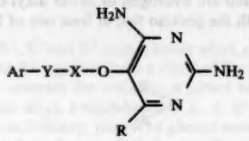
Division of Ser. No. 815,565, Jul. 14, 1977. This application Feb. 9, 1979, Ser. No. 10,630

Claims priority, application United Kingdom, Jul. 29, 1976, 31582/76

Int. Cl.[2] A61K *31/505*

U.S. Cl. 424—251 54 Claims

28. A method of treating malarial and bacterial infections in humans and animals which comprises administering to a human or animal in need of such treatment an antimalarially or antibacterially effective amount of a compound of the formula (II):



(II)

or a pharmaceutically acceptable salt thereof, wherein R is hydrogen, methyl or ethyl; X is alkylene of 1 to 10 carbon atoms; Y is O or S; and Ar is phenyl, naphthyl, anthranyl, phenanthryl or phenyl substituted by from 1 to 5 substituents selected from the group consisting of fluorine, chlorine, bromine, lower alkoxyl, lower acyloxyl, lower alkyl, lower alkenyl, cycloalkyl of 5 or 6 carbon atoms, cycloalkenyl of 5 or 6 carbon atoms and lower alkylthio.

4,232,023
NOVEL SOLUBLE DERIVATIVES OF 2,4-DIAMINO PYRIMIDINE

Pierre R. Dick, Villa "Sama Keur" 95, Ave. de la Lanterne 06, and Max Rombi, 67, Rue Rossini 06, both of Nice, France

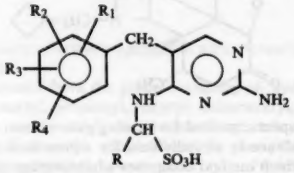
Filed Jul. 7, 1978, Ser. No. 922,845

Claims priority, application France, Jul. 11, 1977, 77 22323

Int. Cl.[3] A61K *31/505;* C07D *239/49*

U.S. Cl. 424—251 15 Claims

1. Derivatives of 2,4-diamino pyrimidine corresponding to the general formula II:



in which:

R_1, R_2, R_3 and R_4 independently represent a hydrogen atom, a halogen atom, a methyl group, a methoxy group or a benzyloxy group; and,

R is the radical of a R—CHO aldehyde wherein R represents hydrogen or an alkyl group containing from 1 to 3 carbon atoms, the Z—CH=CH radical wherein Z represents a hydrogen atom or a benzene ring; or

R represents the radical $HO—CH_2—(CHOH)_n—$ in which n has the value 3 or 4.

4. An antibacterial medicament, comprising as active principle a pharmacologically effective amount of, at least one compound according to claim 1.

4,232,024
1-OXO-1H-PYRIMIDO[6,1-b]BENZTHIAZOLE DERIVATIVES

Werner Winter, Heppenheim; Herman Hindermayr, Mannheim; Egon Roesch, Mannheim; Androniki Roesch, Mannheim, and Otto-Henning Wilhelms, Heddesheim, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

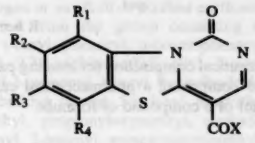
Filed Feb. 26, 1979, Ser. No. 15,372

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1978, 2810863

Int. Cl.[3] A61K *31/505;* C07D *513/04*

U.S. Cl. 424—251 10 Claims

1. A 1-oxo-1H-pyrimido[6,1-b]benzthiazole of the formula



wherein

R_1, R_2, R_3 and R_4 each independently is hydrogen, halogen, hydroxy, nitro, trifluoromethyl, or alkyl, alkoxy or alkylthio containing up to 6 carbon atoms, or

R_2 and R_3 together are alkylenedioxy containing up up to 3 carbon atoms, and

X is hydroxy, alkoxy containing up to 6 carbon atoms or tetrazolyl-5-amino,

or a pharmacologically acceptable salt thereof.

8. An anti-allergy pharmaceutical composition comprising a physiologically acceptable diluent and an anti-allergically effective amount of a compound according to claim 1.

4,232,025
POLYMERIC INSECTICIDAL COMPOSITIONS OF MATTER

James R. Sanborn, and Charles H. Tieman, both of Modesto, Calif., assignors to Shell Oil Company, Houston, Tex.

Filed May 7, 1979, Ser. No. 36,630

Int. Cl.[3] A01N *9/22;* C07D *279/04*

U.S. Cl. 424—256 6 Claims

1. The product formed by reaction of tetrahydro-2-(nitromethylene) 2H-1,3-thiazine with an oxidized polysaccharide free from more than a minor amount of the carboxyl moiety.

5. A composition adopted for controlling corn earworms, which comprises an effective amount of a product of claim 1 together with an adjuvant therefor.

4,232,026
DIAZADITWISTANES, AND PHARMACEUTICAL COMPOSITIONS FOR TREATING PAIN IN WARM BLOODED ANIMALS CONTAINING THEM

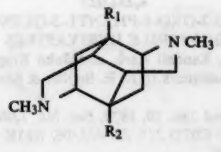
Jan ten Broeke, Somerset, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Jul. 20, 1978, Ser. No. 926,353

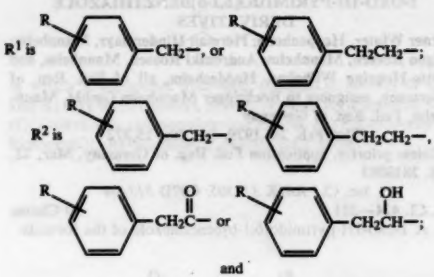
Int. Cl.[3] A61K *31/47;* C07D *471/08*

U.S. Cl. 424—258 7 Claims

1. A compound of structural formula:

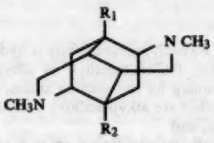


or a pharmaceutically acceptable salt thereof wherein:

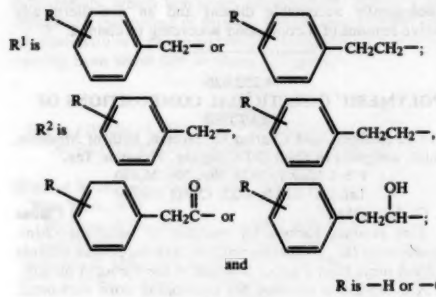


R is —H, or —OH.

4. A pharmaceutical composition for treating pain in a warm blooded animal comprising a pharmaceutical carrier and an effective amount of a compound of formula:



or a pharmaceutically acceptable salt thereof, wherein:



R is —H or —OH.

4,232,027

1,2-DIHYDRO-2-OXO-4-PHENYL-3-QUINOLINECARBONITRILE DERIVATIVES

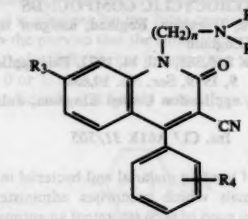
Chester F. Turk, Kendall Park, and John Krapcho, Somerset, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Jan. 29, 1979, Ser. No. 7,069

Int. Cl.³ C07D *215/20, 413/06*; A61K *31/47*

U.S. Cl. 424—258 **9 Claims**

1. A compound of the structure



wherein $(CH_2)_n$ is a straight chain alkylene group containing 2 to 5 carbons in the normal chain, and R_1 and R_2 may be the same or different and are hydrogen or lower alkyl containing 1 to 8 carbons, with the proviso that at least one of R_1 and R_2 is lower alkyl, or

may be taken together to form a pyrrolidino, piperidino or morpholino ring, and R_3 and R_4 are the same or different and are hydrogen, lower alkyl containing 1 to 8 carbons, lower alkoxy containing 1 to 8 carbons, bromine, chlorine, fluorine or trifluoromethyl, and physiologically acceptable acid-addition salts thereof.

4,232,028

17-CYCLOBUTYLMETHYL-4,5α-EPOXY-3-HYDROXY-14-METHOXY-8α-METHYLMORPHINAN-6-ONE, AND METHOD OF TREATING PAIN WITH IT

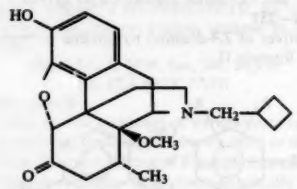
Raj K. Razdan, Belmont, and Anil C. Ghosh, Lexington, both of Mass., assignors to Sisa, Incorporated, Cambridge, Mass.

Filed Jun. 18, 1979, Ser. No. 49,460

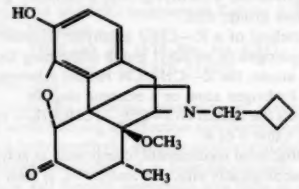
Int. Cl.³ A61K *31/485*; C07D *489/08*

U.S. Cl. 424—260 **6 Claims**

1. 17-cyclbutylmethyl-4,5α-epoxy-3-hydroxy-14-methoxy-8α:methylmorphinan-6-one characterized by the formula:



4. A therapeutic method for treating pain without liability of drug dependence in an individual for whom such therapy is indicated which method comprises administering an effective analgesic amount of a compound corresponding to the structural formula:

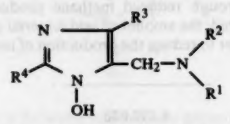


4,232,029
1-HYDROXYIMIDAZOLE-5-METHANAMINE DERIVATIVES

Adolf H. Philipp, St. Laurent, and Ivo L. Jirkovsky, Montreal, both of Canada, assignors to American Home Products Corporation, New York, N.Y.

Filed Nov. 3, 1978, Ser. No. 957,627
Int. Cl.³ A61K *31/415, 31/44;* **C07D** *233/70, 403/02*
U.S. Cl. 424—263 **27 Claims**

1. A compound of formula I



(I)

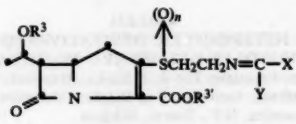
in which R^1, R^2 and R^3 each is lower alkyl, or R^1 is lower alkyl and R^2 and R^3 together form a chain of formula —C(=NOH-)—CH_2— wherein the —CH_2— is joined to the nitrogen, and R^4 is lower alkyl, 1-naphthalenyl, 2-, 3- or 4-pyridinyl, 2- or 3-furyl, 2- or 3-thieny, phenyl or phenyl mono-, di- or trisubstituted with halo, lower alkyl, lower alkoxy, hydroxy, or trifluoromethyl, or a therapeutically acceptable acid addition salt thereof.

4,232,030
SUBSTITUTED N-METHYLENE DERIVATIVES OF THIENAMYCIN SULFOXIDE AND SULFONE

Burton G. Christensen, Metuchen; William J. Leanza, Berkeley Heights, and Kenneth J. Wildonger, Somerville, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Sep. 15, 1977, Ser. No. 833,619
Int. Cl.³ A61K *31/40;* **C07D** *487/04;* **A61K** *31/44*
U.S. Cl. 424—263 **23 Claims**

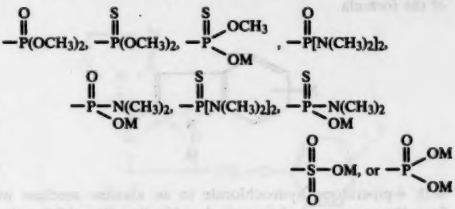
1. A compound having the structure:



and the pharmaceutically acceptable salts thereof wherein:

n is 1 or 2;

R^3 is selected from the group consisting of: hydrogen, formyl, acetyl, propionyl, butyryl, chloroacetyl, methoxyacetyl, aminoacetyl, methoxycarbonyl, ethoxycarbonyl, methylcarbamoyl, ethylcarbamoyl, phenylthiocarbonyl, 3-aminopropionyl, 4-aminobutyryl, N-methylaminoacetyl, N,N-dimethylaminoacetyl, N,N,N-trimethylaminoacetyl, 3-(N,N-dimethyl)aminopropionyl, 3-(N,N,N-trimethyl)amino propionyl, N,N,N-triethylaminoacetyl, pyridiniumacetyl, guanylthioacetyl, guanidinoacetyl, 3-guanidinopropionyl, N^3-methylguanidinopropionyl, hydroxyacetyl, 3-hydroxypropionyl, acryloyl, propynol, malonyl, phenoxycarbonyl amidinoacetyl, acetamidinoacetyl, amidinopropionyl, acetamidinopropionyl, guanylureidoacetyl, guanylcarbamoyl, carboxymethylaminoacetyl, sulfoacetylaminoacetyl, phosphonoacetylaminoacetyl, N^3-dimethylaminoacetamidinopropionyl, ureidocarbonyl, dimethylaminoguanylthioacetyl, 3-(1-methyl-4-pyridinium)propionyl, 3-(5-aminoimidazol-1-yl)propionyl, 3-methyl-1-imidazoliumacetyl, 3-sydnonylacetyl, o-aminomethylbenzoyl, o-aminobenzoyl,



M is hydrogen or an alkali or alkaline earth metal cation; $R^{3'}$ is selected from the group consisting of: hydrogen, methyl, t-butyl, phenacyl, p-bromophenacyl; pivaloyloxymethyl, 2,2,2-trichloroethyl, allyl, 3-methyl-2-butenyl, 2-methyl-2-propenyl, benzyl, benzylhydryl, p-t-butylbenzyl, phthalidyl, phenyl, 5-indanyl, acetylthiomethyl, acetoxymethyl, propionyloxymethyl, methallyl, 3-butenyl, 4-pentenyl, 2-butenyl, acetoxyacetylmethyl, pivaloylacetylmethyl, diethylamino, dimethylaminoethyl, methoxymethyl, p-acetoxybenzyl, p-pivaloylbenzyl, p-isopropoxybenzyl, 5-indanylmethyl, benzyloxymethyl, methylthioethyl, dimethylaminoacetoxymethyl, crotonolacton-3-yl, acetamidomethyl, acetylthioethyl, pivaloylthiomethyl, methylthiomethyl; X and Y are independently selected from the group consisting of hydrogen, R, —OR, S-R and NR^1R^2 R^1 and R^2 are independently selected from the group consisting of hydrogen; alkyl having 1–6 carbon atoms; alkenyl having 3–6 carbon atoms; cycloalkyl, cycloalkylalkyl, cycloalkenyl and cycloalkenylalkyl having 3–6, 4–7 4–6 and 4–7 carbon atoms, respectively; benzyl; p-methoxybenzyl, p-dimethylaminobenzyl, cinnamyl; 2-thienylmethyl, 3-thienylmethyl, 2-furylmethyl, 1-methyl-5-tetrazolylmethyl; and R is selected from the group consisting of hydrogen; alkyl having from 1–6 carbon atoms; aminoalkyl having 1–6 carbon atoms, aminoalkenyl having 1–6 carbon atoms; alkenyl having 2–6 carbon atoms; alkoxyalkyl having 2–6 carbon atoms; mono-, di- and triloweralkylaminoalkyl having 2–12 carbon atoms; perhaloalkyl having from 1–6 carbon atoms; alkylthioalkyl having 2–6 carbon atoms; phenyl; benzyl; 2-, 3- and 4-pyridyl and 2-thiazolyl.

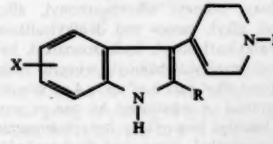
23. An antibiotic pharmaceutical composition consisting essentially of a therapeutically effective amount of a compound according to claim 1 and a pharmaceutical carrier therefor.

4,232,031
PROCESS FOR PREPARATION OF PIPERIDYL-INDOLES

Claude Dumont, Nogent-sur-Marne; Jacques Guillaume, Sevran, and Lucien Nedelec, Le Raincy, all of France, assignors to Roussel Uclaf, Paris, France

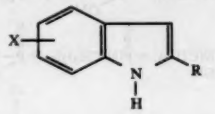
Filed Dec. 6, 1979, Ser. No. 100,909
Claims priority, application France, Dec. 22, 1978, 78 36167
Int. Cl.³ C07D *401/04;* **A61K** *31/40*
U.S. Cl. 424—263 **6 Claims**

1. A process for the preparation of piperidyl-indoles of the formula



wherein X is selected from the group consisting of hydrogen,

fluorine, chlorine, bromine, alkoxy of 1 to 3 carbon atoms and nitro and R is selected from the group consisting of hydrogen and alkyl of 1 to 3 carbon atoms comprising reacting an indole of the formula



with 4-piperidone hydrochloride in an alkaline medium to form the compound of formula I and optionally salifying the latter to obtain its acid addition salt.

4. A compound selected from the group consisting of 5-nitro-3-(1,2,3,6-tetrahydropyridin-4-yl)-1H-indole and its non-toxic, pharmaceutically acceptable acid addition salts.

5. A composition having antidepressive, antiemetic and antiparkinsonian activity comprising an effective amount of 5-nitro-3-(1,2,3,6-tetrahydropyridin-4-yl)-1H-indole and its non-toxic, pharmaceutically acceptable acid addition salts and an inert pharmaceutical carrier.

4,232,032

METHODS, COMPOSITIONS AND CHEMICAL COMPOUNDS FOR USE IN ANIMAL HUSBANDRY

Francis T. Boyle, and Alan Davies, both of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Mar. 23, 1976, Ser. No. 669,498

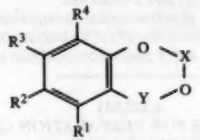
Claims priority, application United Kingdom, Apr. 8, 1975, 14316/75

Int. Cl.[2] C07D *319/04;* A23K *1/00*

U.S. Cl. 424—269 **6 Claims**

1. In the practice of ruminant animal husbandry, the method of suppressing methane production in the rumen and thereby improving the rate of growth or feed efficiency or both which comprises orally administering to animals from 0.01 mg/kg body weight to 30 mg/kg body weight per day per animal of a material selected from the group consisting of:

(a) benzo[1,3]dioxin derivatives of the formula:



I

wherein:

X is 2,2,2-trichloroethylidene, 2,2-dichlorovinylidene or 2,2-dichloro-2-(C_{1-3} alkoxy)ethylidene;

Y is 2,2-dichlorovinylidene or 2,2-dichloroethylidene;

R^1, R^2, R^3 and R^4, which may be the same or different, are: hydrogen, halogen, amino, carbamoyl, carboxy, chloroformyl, cyano, formyl, formyloxymethyl, hydrazinocarbonyl, hydroxy, nitro, sulfamoyl, sulfo, and ammonium sulfonato; alkanoyl, mono-or di-alkanoylamino, alkanoylhydrazonomethyl, alkanoyloxy, alkoxy, alkoxycarbonyl, alkoxyhydroxymethyl, alkyl, mono- and di-alkylsulfamoyl, mono- and di-alkylcarbamoyl, hydrazonoalkyl, hydroxyalkyl and hydroxyalkylcarbamoyl, wherein each alkanoyl, alkoxy and alkyl part is of up to 4 carbon atoms, and is unsubstituted or substituted by one or more halogen atoms; benzoyl, benzoyloxy, benzylideneamino, phenylhydrazonomethyl, mono- and di-phenylsulfamoyl, and phenylthioureido, in each of which the phenyl ring is unsubstituted, or is substituted by one to three halogen, nitro or C_{1-4}-alkoxy substituents; or tetrazol-5-yl;

(b) the γ-lactones of benzo[1,3]dioxin derivatives, as defined above, wherein R^1 is carboxy and R^2 is 1-hydroxyalkyl, unsubstituted or substituted by halogen as defined above;

(c) the base addition salts of benzo[1,3]dioxin derivatives, as defined above, which contain carboxy, or sulfonic acid; and

(d) the acid addition salts of benzo[1,3]dioxin derivatives as defined above, which contain amino, and continuing said administration for as long as improved growth rate or feed efficiency through reduced methane production in the rumen is desired, the amount of said material administered being sufficient to reduce the production of methane in the rumen.

4,232,033

COMBATING FUNGI WITH DIASTEREOMERIC FORM A OF 1-PHENOXY-3,3-DIMETHYL-1-(1,2,4-TRIAZOL-1-YL)-BUTAN-2-OLS

Wolfgang Krämer; Karl H. Büchel; Wolf-Dietrich Pflugbeil, all of Wuppertal; Paul-Ernst Frohberger, Leverkusen, and Wilhelm Brandes, Leichlingen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Sep. 11, 1978, Ser. No. 941,832

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1977, 2743767

Int. Cl.[3] A01N *43/64;* C07D *249/08*

U.S. Cl. 424—269 **7 Claims**

1. The substantially pure diastereomeric form A of a triazolyl-O,N-acetal selected from the group consisting of 1-(4-chlorophenoxy)-3,3-dimethyl-1-(1,2,4-triazol-1-yl)-butan-2ol and 1-(4-biphenylyloxy)-3,3-dimethyl-1-(1,2,4-triazol-1-yl)-butan-2-ol.

4. A fungicidal composition containing as active ingredient the substantially pure diastereomeric form of a compound according to claim 1 in admixture with a diluent.

5. A method of combating fungi which comprises applying to the fungi, or to a habitat thereof, the substantially pure diastereomeric form of a compound according to claim 1.

4,232,034

HETEROCYCLIC DERIVATIVES OF 1-(1,3-DIOXOLAN-2-YLMETHYL)-1H-IMIDAZOLES

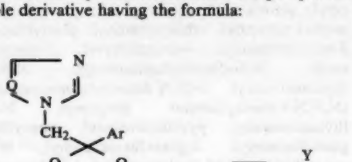
Jan Heeres, Vosselaar; Leo J. J. Backx, Arendonk, and Joseph H. Mostmans, Antwerp, all of Belgium, assignors to Janssen Pharmaceutica, N.V., Beerse, Belgium

Division of Ser. No. 853,726, Nov. 21, 1977, Pat. No. 4,160,841, which is a continuation-in-part of Ser. No. 764,265, Jan. 31, 1977, abandoned. This application Jun. 20, 1979, Ser. No. 50,369

Int. Cl.[3] A01N *43/64;* C07D *405/14*

U.S. Cl. 424—269 **8 Claims**

1. A chemical compound selected from the group consisting of an azole derivative having the formula:



and the pharmaceutically acceptable acid addition salts and stereochemically isomeric forms thereof, wherein:

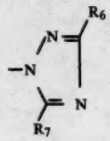
Q is CH;

Ar is a member selected from the group consisting of phenyl

and substituted phenyl, said substituted phenyl having from 1 to 3 substituents independently selected from the group consisting of halo, lower alkyl and lower alkyloxy; and

the radical Y is a member selected from the group consisting of:

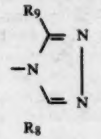
a 1H-1,2,4-triazol-1-yl radical of the formula



(d)

wherein R_6 is selected from the group consisting of hydrogen and lower alkylthio, and, R_7 is selected from the group consisting of hydrogen, lower alkyl and phenyl;

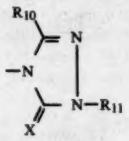
a 4H-1,2,4-triazol-4-yl radical of the formula



(e)

wherein R_8 is selected from the group consisting of hydrogen, lower alkyl, lower alkyloxy, lower alkylthio, lower alkylsulfinyl and lower alkylsulfonyl, and, R_9 is selected from the group consisting of hydrogen and lower alkyl;

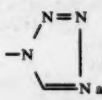
a 2,3-dihydro-4H-1,2,4-triazol-4-yl radical of the formula



(f)

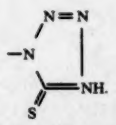
wherein X is selected from the group consisting of O and S, and, R_{10} and R_{11} are each independently selected from the group consisting of hydrogen and lower alkyl, provided that when said X is S then said R_{11} is hydrogen;

a 1H-1,2,3,4-tetrazol--yl radical of the formula



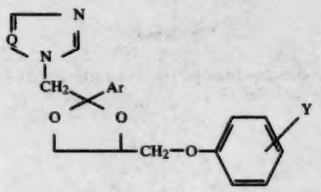
(g);

a 4,5-dihydro-5-thioxo-1H-1,2,3,4-tetrazol-1-yl radical of the formula



(h)

8. A composition for combatting the growth of a microorganism selected from the group consisting of fungus and bacterium comprising an inert carrier material and as an active ingredient an effective amount of a compound selected from the group consisting of an azole derivative having the formula:



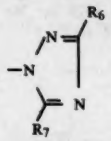
and the pharmaceutically acceptable acid addition salts and stereochemically isomeric forms thereof, wherein:

Q is CH;

Ar is a member selected from the group consisting of phenyl and substituted phenyl, said substituted phenyl having from 1 to 3 subtituents independently selected from the group consisting of halo, lower alkyl and lower alkyloxy; and

the radical Y is a member selected from the group consisting of:

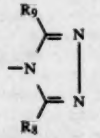
a 1H-1,2,4-triazol-1-yl radical of the formula



(d)

wherein R_6 is selected from the group consisting of hydrogen and lower alkylthio, and, R_7 is selected from the group consisting of hydrogen, lower alkyl and phenyl;

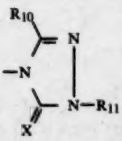
a 4H-1,2,4-triazol-4-yl radical of the formula



(e)

wherein R_8 is selected from the group consisting of hydrogen, lower alkyl, lower alkyloxy, lower alkylthio, lower alkylsulfinyl and lower alkylsulfonyl, and, R_9 is selected from the group consisting of hydrogen and lower alkyl;

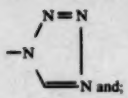
a 2,3-dihydro-4H-1,2,4-triazol-4-yl radical of the formula



(f)

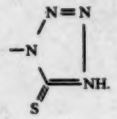
wherein X is selected from the group consisting of O and S, and, R_{10} and R_{11} are each independently selected from the group consisting of hydrogen and lower alkyl, provided that when said X is S then said R_{11} is hydrogen;

a 1H-1,2,3,4-tetrazol-1-yl radical of the formula



(g);

a 4,5-dihydro-5-thioxo-1H-1,2,3,4-triazol-1-yl radical of the formula



(h)

4,232,035

CARBAMATE PESTICIDAL COMPOUNDS COMPOSITIONS AND METHODS OF USE

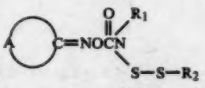
Themistocles D. J. D'Silva, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed Dec. 30, 1975, Ser. No. 645,407

Int. Cl.³ A01N *43/78, 43/80, 43/02;* C07D *339/06*

U.S. Cl. 424—270 **42 Claims**

1. A compound of the formula:



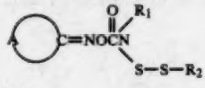
wherein:

R_1 is lower alkyl;

R_2 is alkyl, alkenyl, cycloalkyl, cycloalkenyl, bicycloalkyl, bicycloalkenyl, phenyl, phenylalkyl or phenyl or phenylalkyl substituted with one or more chloro, bromo, fluoro, nitro, cyano, alkyl, alkylthio, methylenedioxy, dialkylamino, trifluoromethyl, phenoxy, phenylthio substituents or a combination thereof;

A is a divalent aliphatic chain completing a five or six membered ring, which includes in any combination, one or two divalent oxygen, sulfur, sulfinyl, sulfonyl or amido group.

9. A miticidal, insecticidal and nematocidal composition comprising an acceptable carrier and as an active toxicant amiticidally, insecticidally and nematocidally effective amount of a compound of the formula



wherein:

R_1 is lower alkyl;

R_2 is alkyl, alkenyl, cycloalkyl, cycloalkenyl, bicycloalkyl, bicycloalkenyl, phenyl, phenylalkyl or phenyl or phenylalkyl substituted with one or more chloro, bromo, fluoro, nitro, cyano, alkyl, alkylthio, methylenedioxy, dialkylamino, trifluoromethyl, phenoxy, phenylthio substituents or a combination thereof;

A is a divalent aliphatic chain completing a five or six membered ring, which includes in any combination, one or two divalent oxygen, sulfur, sulfinyl, sulfonyl or amido.

4,232,036

6-, 1- AND 2-SUBSTITUTED-1-CARBADETHIAPEN-2-EM-3-CARBOXYLIC ACIDS

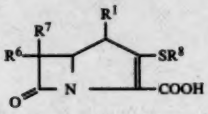
Burton G. Christensen, Metuchen, and David H. Shih, Edison, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Oct. 24, 1978, Ser. No. 954,272

Int. Cl.³ A61K *31/40;* C07D *487/04*

U.S. Cl. 424—274 **6 Claims**

1. A compound having the structure:



wherein R is H; or a pharmaceutically acceptable salt cation; and R^1, R^6, R^7 and R^8 are independently selected from the group consisting of hydrogen, (R^1 is not H) substituted and unsubstituted: alkyl, alkenyl, alkynyl, having from 1–10 carbon atoms; cycloalkyl, cycloalkylalkyl, and alkylcycloalkyl, having 3–6 carbon atoms in the cycloalkyl ring and 1–6 carbon atoms in the alkyl moieties; phenyl; aralkyl, aralkenyl, and aralkynyl wherein the aryl moiety is phenyl and the alkyl chain has 1–6 carbon atoms; wherein the substituent or substituents relative to the above-named radicals are selected from the group consisting of: amino, mono-, di- and trialkylamino, hydroxyl, alkoxyl, mercapto, alkylthio, phenylthio, sulfamoyl, amidino, guanidino, nitro, chloro, bromo, fluoro, cyano and carboxy; and wherein the alkyl moieties of the above-recited substituents have 1–6 carbon atoms; when R^8 is 2-aminoethyl, and when R^7/R^6 is hydrogen, then R^6/R^7 is not 1-hydroxyethyl.

6. An antibiotic pharmaceutical composition comprising a therapeutically effective amount of a compound according to claim **1** and a pharmaceutical carrier therefor.

4,232,037

2,6-DIALKOXYBENZAMIDES, INTERMEDIATES, PHARAMACEUTICAL COMPOSITIONS AND METHODS FOR TREATMENT OF PSYCHOTIC DISORDERS

Gosta L. Florvall, and Sven O. Ogren, both of Södertalje, Sweden, assignors to Astra Läkemedel Aktiebolag, Södertälje, Sweden

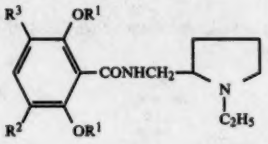
Filed Mar. 8, 1979, Ser. No. 18,784

Claims priority, application Sweden, Mar. 23, 1978, 7803411

Int. Cl.³ A61K *31/40;* C07D *207/08*

U.S. Cl. 424—274 **13 Claims**

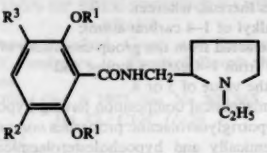
1. A compound of the formula



I

or a pharmaceutically acceptable salt thereof, in which formula R^1 represents an alkyl group with 1–3 carbon atoms, R^2 and R^3 are the same or different and each represents a hydrogen, chlorine or bromine atom.

11. A method for the treatment of psychoses in man, characterized by the administration to a host in need of such treatment of an effective amount of a compound of the formula



or a pharmaceutically acceptable salt thereof, in which formula R^1 represents an alkyl group with 1–3 carbon atoms, R^2 and R^3 are the same or different and each represents a hydrogen, chlorine or bromine atom.

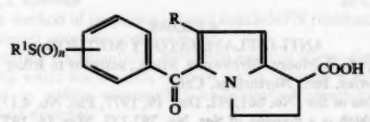
4,232,038

5-ALKYLSULFINYLBENZOYL- AND 5-ALKYLSULFONYLBENZOYL-1,2-DIHYDRO-3H-PYRROLO[1,2-A]PYRROLE-1-CARBOXYLIC ACIDS

Arthur F. Kluge, Los Altos, and Joseph M. Muchowski, Sunnyvale, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Aug. 31, 1979, Ser. No. 71,443
Int. Cl.[2] C07D *487/04*; A61K *31/40*
U.S. Cl. 424—274 **19 Claims**

1. A compound selected from the group of those represented by the formula:



and the pharmaceutically acceptable, non-toxic alkyl esters having from one to 12 carbon atoms and salts thereof, wherein n is 1 or 2, R represents hydrogen or a lower alkyl group having from 1 to 4 carbon atoms and R^1 represents lower alkyl group having from 1 to 4 carbon atoms at the ortho, meta or para positions of the aroyl group.

13. A composition for treating inflammation, pain or pyrexia in mammals consisting essentially of a pharmaceutically acceptable non-toxic excipient and a therapeutically effective amount of a compound of claim **1**.

15. A composition for administration to a pregnant mammal to delay onset of parturition consisting essentially of a pharmaceutically acceptable non-toxic excipient and a therapeutically effective amount of a compound of claim **1**.

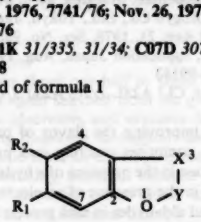
4,232,039

PHENYL- OR CYCLOALKYL-BENZO-OXACYCLIC COMPOUNDS

Annemarie Closse, Binningen; Walter Haefliger, Basel, and Daniel Hauser, Binningen, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Continuation of Ser. No. 795,432, May 10, 1977, abandoned. This application Apr. 14, 1978, Ser. No. 896,481
Claims priority, application Switzerland, May 17, 1976, 6125/76; Jun. 17, 1976, 7741/76; Nov. 26, 1976, 14928/76; Nov. 26, 1976, 14929/76
Int. Cl.[2] A61K *31/335, 31/34*; C07D *307/79, 313/08*
U.S. Cl. 424—278 **14 Claims**

1. A compound of formula I

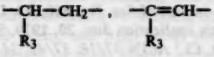


where

R_1 is cycloalkyl of 3 to 8 carbon atoms or phenyl,

R_2 is methyl or chloro,

X—Y is



or $—(CH_2)_4—$, and

R_3 is hydrogen or alkyl of 1 to 4 carbon atoms, with the proviso that when X—Y is

R_2 is chloro when R_3 is hydrogen.

13. A pharmaceutical composition comprising an anti-oedemic, anti-inflammatory or anti-arthritic amount of a compound of claim **1**, in association with a pharmaceutically acceptable diluent or carrier.

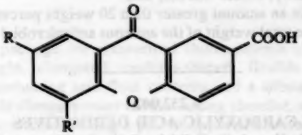
4,232,040

COMPOSITIONS FOR AND A METHOD OF PREVENTING DIABETIC COMPLICATIONS

L. David Waterbury, Cupertino, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Mar. 8, 1978, Ser. No. 884,455
Int. Cl.[3] A61K *31/35, 27/00, 31/425, 31/40*
U.S. Cl. 424—283 **25 Claims**

1. A method for preventing or relieving diabetes mellitus-associated complications chosen from the group consisting of cataracts, retinopathy, and neuropathy in a diabetic mammal, which method comprises topically administering to said mammal an alleviating or prophylactic amount of a compound of the formula



(I)

and pharmaceutically acceptable non-toxic C_1 to C_6 linear or branched alkyl esters, C_1 to C_6 linear or branched alkyl amides or salts thereof where R is selected from the group hydrogen, $R^1(O)_nS—$ where R^1 is C_1 to C_6 linear or branched alkyl when n is the integer 0 or 1, C_1 to C_6 linear or branched hydroxyalkyl, di- C_1 to C_6 linear or branched alkylamino, the alkyl group optionally substituted with hydroxy when n is the integer 2 or hydrogen when n is the integer 3; $R^4C(O)—$ where R^4 is C_1 to C_6 linear or branched alkyl or C_3 to C_{10} carbocyclic alkyl; and C_1 to C_6 linear or branched alkoxy optionally substituted with at least one hydroxy and R' is selected from the group consisting of hydrogen, C_1 to C_{10} linear or branched alkyl, C_1 to C_{10} linear or branched alkoxy, C_1 to C_{10} linear or branched thioalkyl and the radical $R^3SO—$ where R^3 is C_1 to C_6 linear or branched alkyl.

4,232,041

AQUEOUS ANTIMICROBIAL COMPOSITION HAVING IMPROVED STABILITY

George A. Burk, Bay City; Charles E. Reineke, Midland, both of Mich., and Charles A. Wilson, Pittsburg, Calif., assignors to The Dow Chemical Company, Midland, Mich.

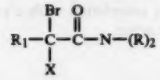
Continuation-in-part of Ser. No. 860,643, Dec. 14, 1977, abandoned. This application Jun. 20, 1979, Ser. No. 50,399

Int. Cl.³ A01N *37/18, 37/43, 34/40*

U.S. Cl. 424—304 **15 Claims**

1. An aqueous antimicrobial composition (a) which is substantially free of glycols having a molecular weight of less than about 70 and of salts of organic acids and which thereby has improved stability of the active antimicrobial ingredient therein; (b) which has a pH of from about 2 to about 5; and (c) which comprises, based upon the total weight of such composition:

(1) from about 1 to about 25 weight percent of an alpha-halogenated amide antimicrobial compound of the formula:

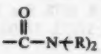


wherein:

X is hydrogen, halogen or a cyano radical;

each R group is independently hydrogen, a monovalent saturated hydrocarbon radical or an inertly substituted monovalent saturated hydrocarbon radical or the two R groups are jointly a divalent saturated hydrocarbon radical or an inertly substituted divalent saturated hydrocarbon radical which, taken with the adjacent nitrogen atom, forms a heterocyclic ring having from 4 to about 10 ring members; and

R_1 is a cyano radical or an amido radical of the formula:



wherein R is as hereinbefore defined;

(2) a water miscible organic solvent in an amount sufficient to dissolve said alpha-halogenated amide, said solvent being selected from the group consisting of normally liquid polyalkylene glycols of the ethylene, trimethylene, or tetramethylene series and the mono- and di-saturated hydrocarbyl ethers thereof; and

(3) water in an amount greater than 20 weight percent based upon the total weight of the aqueous antimicrobial composition.

4,232,042

DI-CARBOXYLIC ACID DERIVATIVES

Alexander C. Campbell, Falkirk; Colin L. Hewett, Glasgow, both of Great Britain, and Filippus J. Zeelen, Heesch, Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

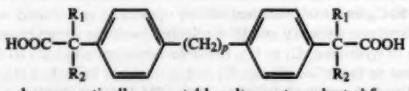
Filed Oct. 4, 1976, Ser. No. 729,509

Claims priority, application United Kingdom, Oct. 7, 1975, 41042/75

Int. Cl.³ C07C *57/38, 69/616;* **A61K** *31/19*

U.S. Cl. 424—308 **4 Claims**

1. A compound of the formula:



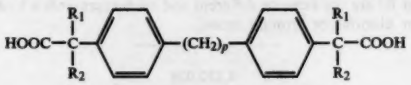
or a pharmaceutically acceptable salt or ester selected from the group consisting of alkyl esters of from 1–4 carbon atoms, phenylethyl esters, phenylpropyl esters, cinnamyl esters and benzyl esters thereof, wherein:

(a) R_1 is alkyl of 1–4 carbon atoms;

(b) R_2 is selected from the group consisting of hydrogen or alkyl of from 1–4 carbon atoms; and

(c) p has the value of 3 or 4.

3. A pharmaceutical composition having hypocholesterolaemic and hypotriglycerolaemic properties comprising a hypotriglycerolaemically and hypocholesterolaemically effective amount of a compound of this formula:



or a pharmaceutically acceptable salt or ester selected from the group consisting of alkyl esters of from 1–4 carbon atoms, phenylethyl esters, phenylpropyl esters, cinnamyl esters and benzyl esters thereof, wherein:

(a) R_1 is alkyl of 1–4 carbon atoms;

(b) R_2 is selected from the group consisting of hydrogen or alkyl of from 1–4 atoms;

(c) p has the value of 3 or 4; and

a non-toxic pharmaceutically acceptable carrier.

4,232,043

ANTI-INFLAMMATORY METHOD

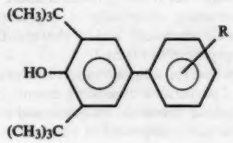
George G. I. Moore, Birchwood, Minn., assignor to Riker Laboratories, Inc., Northridge, Calif.

Division of Ser. No. 861,892, Dec. 19, 1977, Pat. No. 4,172,151, which is a division of Ser. No. 797,137, May 16, 1977, abandoned. This application Jul. 6, 1979, Ser. No. 55,324

Int. Cl.² A61K *31/04, 31/14, 31/045*

U.S. Cl. 424—340 **5 Claims**

1. A method for combatting inflammatory processes in a mammal which comprises administering an effective dose less than the toxic amount of a compound of the formula



wherein R is selected from halogen, methoxy, methyl and 4-nitro to said mammal.

4,232,044

ENZYMATIC IMPROVEMENT OF PROTEIN FLAVOR

Hideo Chiba, Uji; Ryuzo Sasaki, Kyoto; Masaaki Yoshikawa, Joyo; Naofumi Takahashi, Kyoto; Etsuro Sugimoto, Nagoya, and Hirotoshi Samejima, Machida, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Filed Aug. 21, 1978, Ser. No. 935,095

Claims priority, application Japan, Aug. 19, 1977, 52-99142; Aug. 19, 1977, 52-99143

Int. Cl.³ A23L *1/20;* **A23J** *3/00*

U.S. Cl. 426—44 **8 Claims**

1. Process for improving the flavor of protein containing aldehydes which comprises reacting said protein with aldehyde dehydrogenase in the presence of a hydrogen acceptor or aldehyde oxidase in the presence of an electron acceptor until the free and bound aldehydes in said protein are converted to the corresponding acids.

4,232,045

PREPARATION OF FREE-FLOWING PARTICULATE YEAST

Seymour Pomper, Stamford, Conn., and Emanuel Akerman, Bronx, N.Y., assignors to Standard Brands Incorporated, Wilton, Conn.

Filed Oct. 6, 1977, Ser. No. 839,865
Int. Cl.[2] C12C 11/26
U.S. Cl. 426—62 4 Claims

1. A process for preparing a free-flowing particulate bulk yeast product consisting assentially of incorporating into bulk baker's yeast having a moisture content of from about 65 to about 70 percent from about 0.5 to about 3 percent, based on the weight of bulk yeast being treated, of a drying agent having a particle size of less than about 100 milli-microns selected from the group consisting of powdered hydrophilic silicon dioxide, micronized wood pulp and micronized cellulose to produce a bulk yeast product having improved flowability without further drying.

4,232,046

LIQUID STARCH-UREA RUMINANT FEED AND METHOD OF PREPARING SAME

Charles W. Deyoe, and Erle E. Bartley, both of Manhattan, Kans., assignors to Kansas State University Research Foundation, Manhattan, Kans.

Filed Oct. 16, 1978, Ser. No. 951,617
Int. Cl.[3] A23K 1/22
U.S. Cl. 426—69 20 Claims

1. A method of preparing a liquid starch-NPN ruminant feed supplement comprising the steps of:

preparing a substantially NPN-free aqueous slurry comprising water and a solids fraction which includes a quantity of an edible, substantially ungelatinized starch-bearing feed material,

said slurry comprising from about 30% to 90% by weight free water, and correspondingly a solids fraction of from about 10% to 70% by weight;

directing a stream of said slurry to a reaction zone;

subjecting said slurry to elevated pressures ranging from about 1 to 200 psig and to heating to a temperature of from about 215° to 388° F. in said zone for gelatinizing from about 50 to 100% of said starch-bearing feed material in said slurry;

passing said slurry out of said treatment zone while the slurry remains substantially NPN-free; and

adding a quantity of an NPN source to said slurry to yield a feed product,

the ratio of starch-bearing feed material to nitrogen from said NPN source ranging from about 4:0.45 to 1:1.80.

4,232,047

FOOD SUPPLEMENT CONCENTRATE IN A DENSE GLASSEOUS EXTRUDATE

Louis Sair, Evergreen Park, and Ralph A. Sair, Lincolnwood, both of Ill., assignors to Griffith Laboratories U.S.A., Inc., Alsip, Ill.

Continuation-in-part of Ser. No. 719,740, Sep. 2, 1976, abandoned, and Ser. No. 779,476, Mar. 21, 1977, abandoned. This application May 30, 1978, Ser. No. 910,274
Int. Cl.[3] A23L 1/22, 1/30
U.S. Cl. 426—96 5 Claims

1. An encapuslated product in the form of spice concentrates and simulated spices,

comprising from about one-half to about forty percent by weight of an agent selected from the group consisting of essential oils, oleoresins, and mixtures thereof,

said agent being dispersed throughout and encased within but recoverable from an enveloping matrix comprising a fused encapsulating material selected from the group consisting of starches, cereal flour, modified starches, gums, proteins, and mixtures thereof,

said agent being distributed throughout said encapsulating material as a micro dispersion of from about five microns to submicron in size, and

said encapsulated product having a density in the range of from about fifty-five to about ninety pounds per cubic foot;

said encapsulated product containing said micro dispersion being the product obtained by blending said encapsulating material, said agent, and from about ten to about forty percent by weight of water based on the total weight of encapsulating material and water to provide a friable blend, subjecting said blend through extrusion to pressure and to heat to form a glasseous melt, and extruding said melt under non-puffing conditions,

the resulting said product constituting a substantially homogeneous, dense, essentially unexpanded, translucent-to-glassy extrudate,

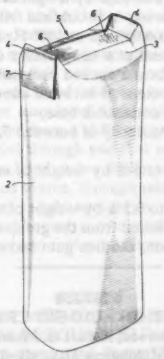
each said encapsulated product exhibiting excellent stability on long-term storage, and being suitable for adding to foods as a flavoring therefor.

4,232,048

PACKAGE CONTAINING PRESSURED LIQUID

Lars-Erik Palm, Höör; Gert Nedstedt, Malmö, and Bengt Nilen, Landskrona, all of Sweden, assignors to AB Ziristor, Lund, Sweden

Continuation of Ser. No. 731,994, Oct. 12, 1976, abandoned. This application Jun. 9, 1978, Ser. No. 913,944
Claims priority, application Sweden, Oct. 28, 1975, 7512022
Int. Cl.[3] B65D 85/72, 77/06
U.S. Cl. 426—115 11 Claims



1. A package for pressurized fluid contents comprising a liquid-tight, elongated, cushion-shaped, flexible inner container containing said fluid contents and a substantially non-extensible elongate outer tubular casing therefor, said cushion-shaped container having a pair of opposed vertical seals along the length of the container and corner lugs folded back against the pair of opposed seals, the upper and lower ends of the elongated container having a convex shape, said casing having a length at least equal to that of said container and a top edge portion with two opposed circumferential portions folded inwardly toward each other against at least a portion of the convex upper end of said container and opposed intermediate circumferential portions of the top edge portion of said casing positioned between the opposed inwardly folded portions, the intermediate circumferential portions remaining unfolded and extending upwardly as extensions of the wall of the casing to resist unfolding of said inwardly folded portions, the container being in contact with an inner surface of said casing along said seals to reinforce the latter, the folded corner lugs of the container being fixed to the inner wall of said casing, the two inwardly folded opposed portions of said casing being fixed to the convex end of said container, the inner edges of the two

opposed inwardly folded circumferential portions at the top of the casing being spaced apart to provide a substantially rectangular opening in said casing to expose a portion of the convex end portion of the container, the exposed portion being provided with at least one pouring opening therein and further including releasable means for covering the pouring opening.

4,232,049

CITRUS JUICE VESICLE CONTAINING FROSTING COMPOSITIONS AND METHOD OF PREPARATION

Jon R. Blake, Brooklyn Center, Minn., assignor to General Mills, Inc., Minneapolis, Minn.

Filed May 31, 1979, Ser. No. 44,799
Int. Cl.[2] A23L *1/34*
U.S. Cl. 426—572 **16 Claims**

1. A frosting composition substantially free of emulsified oleagineous material, comprising:

A. from about 90% to 98% by weight of a comestible base prepared by:

I. blending to form a blend

a. from about 25% to 65% by weight of the blend of citrus juice vesicles having a moisture content between about 89% to 96% by weight of the vesicles;

b. from about 7% to 45% by weight of the blend of a nutritive carbohydrate sweetening agent;

c. sufficient edible non-volatile acid or sodium salt thereof to provide the blend with a pH ranging between about 2.5 to 5.5;

d. from about 1% to 5% by weight of the blend of an ungelatinized starch;

e. from about 8% to 60% by weight of the blend of water, said blend having a Brookfield viscosity of between about 3,000 to 6,000 cp. at 190° F.; and

II. cooking the blend at a temperature of between 180° F. and 280° F. to form a cooked comestible base having;

a. a moisture content of between about 30% to 60% by weight of the comestible base;

b. a Brookfield viscosity of between 7,000 and 10,000 cp. at 190° F.;

B. from about 0.4% to 3% by weight of an acid stable whipping agent; and

C. from about 0.1% to 0.5% by weight of an acid-stable polysaccharide gum selected from the group consisting of locust bean gum, guar gum, xanthan gum and mixtures thereof.

4,232,050

IMITATION ACID-SET CHEESE

Charles E. Rule, Lakewood; Robert G. Manning, and Richard J. Zielinski, both of Middleburg Hts., all of Ohio, assignors to SCM Corporation, N.Y.

Filed Jul. 29, 1977, Ser. No. 820,302
Int. Cl.[3] A23C *19/02*
U.S. Cl. 426—582 **6 Claims**

1. A method for the preparation of an imitation high-moisture acid-set mozzarella cheese characterized as being sufficiently hard to be grated and having the stretch, flavor, meltdown, and browning characteristics of natural mozzarella cheese, comprising the steps of

(a) preparing a formulation consisting essentially of

about 15–35% edible protein of which at least 40% is sodium caseinate,

about 15–30% low melting point hydrogenated vegetable oil,

about 0.5–1.0% calcium ion providing substance,

about 0.5–1.5% organic emulsifying agent,

about 0.2–3% edible acid, and

about 45–53% water,

said vegetable oil having a Wiley Melting Point of about 60°–120° F. said emulsifying agent having an HLB value of more than about 10 and a fluid consistency at ambient temperature,

(b) adding said formulation to a mixing zone and subjecting said formulation to mixing at a temperature in the range of about 130°–172° F.; and

(c) removing the mixed product from said zone and cooling it until a hardened product is obtained.

(d) said organic emulsifying agent being selected from the group consisting of polyglycerol oleate ester having a hydroxyl value of about 400 to 600, a saponification number of about 60 to 100, and acid values of less than about 10; polyoxyethylene (20) sorbitan monoester of fatty acid; a sugar ester which is sucrose monooleate with about 70% monoester; and polyoxyethylene (20) mono- and diglycerides of fatty acids.

4,232,051

METHOD OF SEPARATING LIQUID FROM SOFT PARTICULATE FOOD SOLIDS

Horace Hinds, Jr., Menlo Park, Calif.; David P. Heimerman, Chilton, Wis., and Billy L. Born, Rockford, Ill., assignors to Stoelting, Inc., Kiel, Wis.

Division of Ser. No. 718,744, Aug. 30, 1976, Pat. No. 4,156,384.
This application Jun. 23, 1978, Ser. No. 918,244
Int. Cl.[3] A23C *19/02*
U.S. Cl. 426—582 **10 Claims**

1. In a method for dewatering soft particulate cheese curd in which the cheese curd is placed in a compressed state by compressing it between a belt and a surface, at least one of which is foraminous, to express water from the curd, and in which method such water is drained away from the curd, the improvement for avoiding significant damage to the curd caused by changes in the thickness of a bed of such curd between said surface and said belt, said improvement comprising the steps of providing a variable cross-sectional area separation zone between a curved surface and the belt by supporting said belt for travel over belt intake and discharge rollers respectively disposed ahead of and beyond the extent of the separation zone, said rollers being spaced away from the surface at least as far as the maximum bed thickness and leaving the belt run between said rollers unsupported so that the belt can flex and yield to accomodate beds of various thickness between the belt and the surface, and regulating the cross-sectional area of said zone in response to changes in bed thickness by tightening the belt to a desired belt tension and taking up slack in the belt to maintain said desired tension as said belt run flexes and yields to maintain substantially constant pressure of the belt on the bed and avoid imposing damaging pressure on the cheese curd regardless of bed thickness.

4,232,052

PROCESS FOR POWDERING HIGH FAT FOODSTUFFS

Bernard H. Nappen, Cranford, N.J., assignor to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Mar. 12, 1979, Ser. No. 19,790
Int. Cl.[3] A23D *5/00*; A23L *1/34, 1/36, 1/38*
U.S. Cl. 426—601 **8 Claims**

1. A process for powdering a dry, solid foodstuff which normally forms a paste or grinding having a fat content greater than about 30% to produce a free-flowing powder comprising the steps of adding thereto 25–400% by weight of the fat content of the foodstuff of a grinding agent comprising a food-grade film-forming material which has been spray-dried from solution in the presence of a latent gas and which is characterized by a bulk density within the range of 3 to 25 pounds per cubic foot and grinding the mixture to effect powdering.

4,232,053

COOKED COMESTIBLE BASE CONTAINING CITRUS JUICE VESICLES AND METHOD OF PREPARATION

Jon R. Blake, Brooklyn Center, Minn., assignor to General Mills, Inc., Minneapolis, Minn.

Filed May 31, 1979, Ser. No. 43,993
Int. Cl.[2] A23L *1/212*
U.S. Cl. 426—616 13 Claims

1. A process for the preparation of a comestible base, comprising the step of:

cooking a blend at a temperature of between about 180° F. and 280° F. to form a comestible base having

1. a moisture content of between about 30% to 60% by weight; and
2. a Brookfield viscosity of between about 7,000 and 10,000 cp. at 190° F.,

said blend having a viscosity of between about 3,000 and 6,000 cp. at 190° F. and comprising

1. from about 25% to 65% by weight of the blend of citrus juice vesicles having a moisture content between about 89% to 96% by weight of the vesicles;
2. from about 7% to 45% by weight of the blend of a nutritive carbohydrate sweetening agent;
3. sufficient edible non-volatile organic acid or sodium salts thereof to provide the blend with a pH ranging between about 2.5 to 5.5;
4. from about 1% to 5% by weight of the blend of an ungelatinized starch;
5. from about 8% to 60% by weight of the blend of water.

4,232,054

INGESTABLE COMPOSITION CONSISTING OF A METALLIC NATURAL PROTEINATE AND NUTRITIVE FIBERS

Jean P. Durlach, Paris, France, assignor to Cooperation Pharmaceutique Francaise, France

Filed Jan. 16, 1979, Ser. No. 3,986
Claims priority, application France, Jan. 18, 1978, 78 01402
Int. Cl.[2] A23L *1/10*; A21D *13/02*
U.S. Cl. 426—618 9 Claims

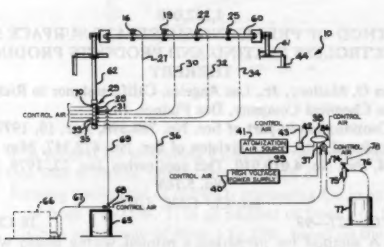
1. An ingestible composition comprising a nutritive cereal fiber and a natural metallic proteinate in the proportion by weight of approximately 5 to 120 parts proteinate for 100 parts fiber.

4,232,055

AUTOMATIC COLOR CHANGE ELECTROSTATIC PAINT SPRAY SYSTEM

Donald O. Shaffer, Temperance, Mich., assignor to Champion Spark Plug Company, Toledo, Ohio

Filed Apr. 24, 1979, Ser. No. 32,790
Int. Cl.[2] B05B *5/02*; B05D *1/04*
U.S. Cl. 427—33 7 Claims



1. A method for electrostatic spraying work pieces with an electrically conductive paint comprising the steps of:

supplying a first electrically conductive paint from a first paint source sequentially through first and second electrically insulated conduits to an electrostatic spray gun to coat one of the work pieces with such first paint;

interrupting paint flow through said first and second conduits;

purging all paint from said first and second conduits with a solvent;

drying at least said first conduit whereby said first conduit is electrically non-conductive; and

supplying a second electrically conductive paint from a second paint source sequentially through a third electrically insulated conduit and said second conduit to said spray gun to coat another of said work pieces with such second paint whereby said non-conductive first conduit insulates said first paint source from paint in said second and third conduits while said second paint is being sprayed.

4. Apparatus for sequentially electrostatic spraying different ones of a plurality of electrically conductive paints from a plurality of paint sources comprising a plurality of electrically non-conductive first paint conduits, a like plurality of first valve means for selectively controlling a flow of paint from a different paint source to each of said first conduits, a second conduit, a plurality of second valve means for selectively connecting said first conduits to said second conduit, each of said paint sources having an associated first valve means, first paint conduit and second valve means, an electrostatic spray gun, means for applying paint from said second conduit to said spray gun, means for simultaneously opening the first and second valve means associated with a first pre-selected paint source whereby paint flows from said pre-selected source through said associated first conduit and said second conduit to said spray gun, means for purging paint with a paint solvent from said first conduit and said second valve means associated with said pre-selected source and from said second conduit and said spray gun, and means for purging such paint solvent from at least said first conduit associated with said pre-selected source to form an electrical insulator between said first and second valve means associated with said pre-selected source whereby, when paint from a different pre-selected source is subsequently supplied through said first valve means, said first conduit and said second valve means associated with said different pre-selected source, through said second conduit and said applying means to said spray gun, such paint from said different pre-selected source is insulated from electrical contact with paint from said first pre-selected source.

4,232,056

THERMOSPRAY METHOD FOR PRODUCTION OF ALUMINUM POROUS BOILING SURFACES

Andrew C. Grant, Amherst, and James W. Kern, North Tonawanda, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Apr. 16, 1979, Ser. No. 30,225
Int. Cl.[3] B05D *1/10*
U.S. Cl. 427—37 9 Claims

1. Method for making an aluminum porous boiling surface having an open cell structure top coating on a metal substrate comprising

(a) melting an essentially pure aluminum oxide free wire by means of a thermospray gun;

(b) entraining said molten aluminum in an inert gas stream to shield from the surrounding atmosphere, and thereby minimize oxide formation, atomize, and transport, such atomized aluminum particles;

(c) positioning said thermospray gun so that the nozzle to substrate distance is in the range of about 2 to 4 inches;

(d) impinging said inert gas stream containing the aluminum particles on said metal substrate to form bond coating having less than 15 percent porosity and having a thickness of not greater than 4 mils;

(e) than increasing the nozzle to substrate distance to a distance in the range of from 4 to 10 inches; and

(f) impinging said inert gas stream containing the aluminum

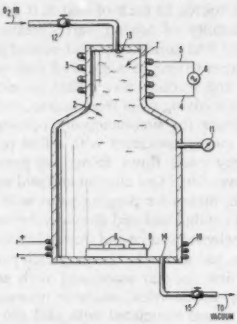
particles on said bond coating to form an open cell structure essentially oxide free top coating, having porosity of greater than 18% and having a thickness of at least four times the thickness of the bond coating, thereby producing a porous boiling surface having sufficient open cell porosity required for effective performance as a boiling surface while exhibiting good adhesion and mechanical strength.

4,232,057

SEMICONDUCTOR PLASMA OXIDATION

Asit K. Ray, Mt. Kisco, and Arnold Reisman, Yorktown Heights, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 1, 1979, Ser. No. 16,648
Int. Cl.³ B05D *3/06*
U.S. Cl. 427—39 **4 Claims**



1. The process of linear plasma oxide growth on semiconductor substrates comprising in combination the steps of:
providing a container having a separated plasma generation location and an oxide growth location,
maintaining in said container an oxygen ambient at a pressure in a range of less than 40 millitorr,
applying power external to said container adjacent to said plasma generation location sufficient to form a plasma of said oxygen, and
maintaining a substrate temperature in the range of 300° to 800° C. with a temperature source external to said container adjacent to said oxide growth location.

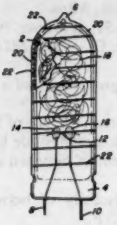
4,232,058

METHOD OF COATING A LAMP WITH A U.V. CURABLE RESIN WITH FIBERS THEREIN

Judith A. Dow, Boston, and Timothy Fohl, Carlisle, both of Mass., assignors to GTE Products Corporation, Stamford, Conn.

Division of Ser. No. 699,139, Jun. 23, 1976. This application Oct. 13, 1978, Ser. No. 950,961
Int. Cl.³ B05D *1/18, 3/06;* F21K *5/02*
U.S. Cl. 427—54.1 **4 Claims**

1. A method of applying a protective light-transmitting coating on the exterior surface of a lamp envelope, said method comprising:
mixing lengths of fiber into a liquid photopolymer, said lengths of fiber being between about the length of the maximum dimension of said envelope and 1/16 inch,
dipping said envelope into the mixture of fibers and liquid photopolymer, and
irradiating the coated envelope with a source of ultraviolet light for a period of between about 0.1 second and 10 seconds so as to cure-harden the fiber-reinforced photo-



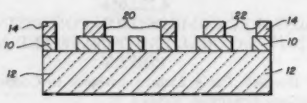
polymer coated on said lamp, whereby a smooth coating surface is provided with minimized protrusion of fibers.

4,232,059

PROCESS OF DEFINING FILM PATTERNS ON MICROELECTRONIC SUBSTRATES BY AIR ABRADING

William G. Proffitt, St. Petersburgh, Fla., assignor to E-Systems, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 825,209, Aug. 17, 1977, abandoned. This application Jun. 6, 1979, Ser. No. 46,031
Int. Cl.³ B05D *5/12;* B24B *1/04*
U.S. Cl. 427—96 **5 Claims**



1. A process for delineating a film pattern in an air abrasive electroconductive film coating material on a substantially nonconductive substrate comprising:
forming a substantially continuous film coating of antimony doped tin oxide on the substrate, said film coating having a thickness between about 50 microinches and about 250 microinches;
integrally applying to said film coating a mask film of metallic material which is air abrasive resistant relative to the antimony doped tin oxide;
selectively etching said mask film to generate a mask to form masked and unmasked portions on said film coating corresponding to the desired pattern; and
air abrading said film coating thereby leaving the masked portions of said film coating remaining on the substrate and removing the unmasked portions of said film coating.

4,232,060

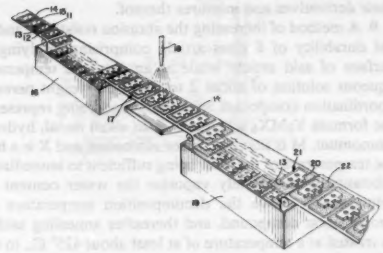
METHOD OF PREPARING SUBSTRATE SURFACE FOR ELECTROLESS PLATING AND PRODUCTS PRODUCED THEREBY

Glenn O. Mallory, Jr., Los Angeles, Calif., assignor to Richardson Chemical Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 788,598, Apr. 18, 1977, abandoned, which is a division of Ser. No. 473,147, May 24, 1974, Pat. No. 4,019,910. This application Jan. 22, 1979, Ser. No. 5,169
Int. Cl.² C23C *3/02*
U.S. Cl. 427—98 **16 Claims**

1. A method for preparing a printed wiring board which comprises treating a wiring board having a circuitry pattern thereon with a polymetallic catalyzing agent bath including a deposition-enhancing metal selected from the group consisting of nickel, cobalt, and combinations thereof, and a secondary metal selected from the group consisting of tin, molybdenum,

copper, tungsten, and combinations thereof, said catalyzing agent bath including copper only when it also includes one or more of tin, molybdenum or tungsten as said secondary metal, said bath including an ester complex of a polyhydric compound, said catalyzing agent bath enhancing subsequent overplating onto said circuitry pattern, said treating step lasting for a time period sufficient to nucleate the surface of the circuitry pattern and insufficient to deposit a generally continuous plating film thereon, said treating step being followed by rinsing



said catalyzing agent bath treated circuit board with an aqueous rinsing agent, said treating step and said rinsing step cooperating to enhance catalyzing agent film formation onto said circuitry pattern in preference to portions of the wiring board that are not within the circuitry pattern to provide a preferentially catalyzed wiring board; and thereafter immersing the preferentially catalyzed wiring board into a bath for overplating the circuitry pattern with a metal selected from the group consisting of nickel, cobalt, and polyalloys including nickel or cobalt.

4,232,061

MAGNETIC RECORDING MEDIUM AND PROCESS FOR PRODUCING THE SAME

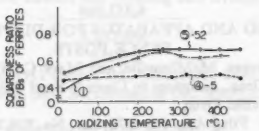
Seizi Hattori, Ibaragi; Koichi Makino, Yokohama; Takehiko Nakagawa, Kawasaki, and Masayoshi Shinohara, Kokubunji, all of Japan, assignors to Fujitsu Limited, Japan

Filed Aug. 18, 1977, Ser. No. 825,790

Claims priority, application Japan, Sep. 1, 1976, 51-103736

Int. Cl.[2] G11B *5/84*

U.S. Cl. 427—130 **12 Claims**



1. A process for producing a magnetic recording medium of a thin film of ferrite, comprising the steps of:

forming a thin film of α-Fe_2O_3 containing Cu in an amount of from 1 to 15%, Ti in an amount of from 1 to 10% and Co in an amount of from 1 to 10%, based on the number of atoms of Fe of said ferrite;

reducing said α-Fe_2O_3 to Fe_3O_4 by heating said α-Fe_2O_3 at a temperature in the range of from 225° to 400° C. in a reducing atmosphere; and,

oxidizing said Fe_3O_4 to δ-Fe_2O_3 by heating said Fe_3O_4 at a temperature in the range of from 150° to 450° C. in an oxidizing atmosphere.

4,232,062

METHOD OF COATING GLASS SURFACE WITH HEAT-REFLECTIVE TITANIUM OXIDE FILM

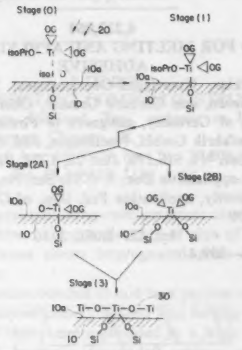
Seiki Okino; Kunio Nakata; Tosiharu Yanai, and Takayoshi Kandachi, all of Matsusaka, Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Mar. 14, 1979, Ser. No. 20,464

Claims priority, application Japan, Mar. 16, 1978, 53-29307

Int. Cl.[2] B05B *5/00*

U.S. Cl. 427—160 **11 Claims**



1. In a method of coating a glass surface with a heat-reflecting metal oxide film, which comprises titanium oxide as an essential component thereof, by applying a solution containing a thermally decomposable titanium compound dissolved in an organic solvent onto a surface of a glass body and heating the solution on the glass surface to cause thermal decomposition of the titanium compound to titanium oxide,

the improvement comprising the use of a chelated titanium compound as said thermally decomposable titanium compound, said chelated titanium compound having at least one alkoxy group selected from the group consisting of propoxy groups and butoxy groups and at least one octyleneglycol chelate ligand.

4,232,063

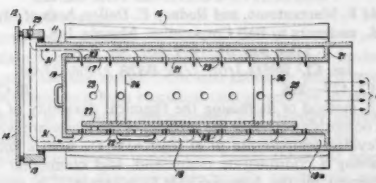
CHEMICAL VAPOR DEPOSITION REACTOR AND PROCESS

Richard S. Rosler, Saratoga, and Robert W. East, San Jose, both of Calif., assignors to Applied Materials, Inc., Santa Clara, Calif.

Continuation of Ser. No. 773,974, Mar. 3, 1977, abandoned. This application Nov. 14, 1978, Ser. No. 960,594

Int. Cl.[3] B05D *5/12*; B05C *13/00*

U.S. Cl. 427—94 **7 Claims**



1. In a process for forming films of relatively uniform thickness on a plurality of generally planar wafers in a reaction chamber having an elongated distribution tube of slightly

greater diameter than the wafers with a plurality of axially spaced openings formed therein, the steps of:

A. placing the wafers in the distribution tube with the wafers spaced axially along the tube so that the major surfaces of the wafers are generally perpendicular to the axis of the tube and the spacing between adjacent ones of the wafers is at least as great as the distance between the edges of the wafers and the side wall of the distribution tube;

B. introducing a reactant gas into the chamber outside the tube with the pressure within the chamber at a subatmospheric level; and

C. permitting the gas to pass through the openings in the tube to the wafers for a time sufficient to deposit a layer of predetermined thickness on the wafers.

4,232,064
METHOD FOR MELTING AND APPLYING A FUSION ADHESIVE

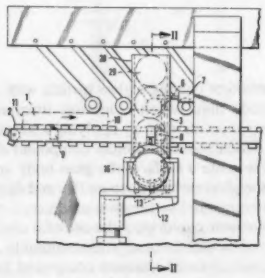
Walter Nicklas, Nuertingen-Oberensingen; Dietrich Hesler, Frickenhausen, and Gerhard Gresser, Oberboihingen, all of Fed. Rep. of Germany, assignors to Firma Karl M. Reich Maschinenfabrik GmbH, Nuertingen, Fed. Rep. of Germany

Division of Ser. No. 918,570, Jun. 23, 1978, Pat. No. 4,178,876. This application Dec. 7, 1978, Ser. No. 967,105

Claims priority, application Fed. Rep. of Germany, Jul. 14, 1977, 2731799

Int. Cl.[2] B05D *5/10*

U.S. Cl. 427—208.4 **4 Claims**



1. A method for melting and applying fusion adhesive to a work piece in a gluing machine, comprising the steps of: supplying the fusion adhesive from a magazine into a melting chamber, pressing said fusion adhesive by power operated feed advance means in the direction and against a heatable melting wall, melting only a zone of the fusion adhesive which rests against said melting wall, supplying the molten adhesive under pressure to an applicator device, and initiating the operation of said feed advance means for the fusion adhesive in response to the movement of said work piece through the gluing machine.

4,232,065
AQUEOUS METAL COORDINATION COMPOUNDS AS PROTECTIVE COATINGS FOR GLASS

Arnold F. Marcantonio, and Rodney E. Dailey, both of Muncie, Ind., assignors to Ball Corporation, Muncie, Ind.

Filed Jan. 31, 1979, Ser. No. 8,291

Int. Cl.[2] B05D *3/02, 7/26*; B32B *17/06, 27/06*

U.S. Cl. 427—226 **20 Claims**

1. A method of increasing the chemical durability of glassware comprising treating the surfaces of the glassware while at an elevated temperature of at least 425° C., with a solution containing a coordination compound, said compound being represented by the formula Y_2MX_6 wherein Y is an alkali metal, hydrogen or ammonium, M is titanium, tin or zirconium and X is a halogen, said compound being present in a concentration of about 2 to about 50 weight percent.

5. A method of increasing the abrasion resistance and chemical durability of a glass article comprising contacting the surface of said article while at an elevated temperature of at least 425° C., with an aqueous solution having therein MX_6^{-2} ions at a concentration of about 2 to about 50 weight percent wherein M is titanium, tin or zirconium and X is a halogen, the temperature of the glass being sufficient to immediately and substantially completely vaporize the water content of said solution and above the decomposition temperature of said MX_6^{-2}, and thereafter applying to said surface an organic material selected from the group consisting of polyethylene, polypropylene, polystyrene, polyurethane, and fatty acids and their derivatives and mixtures thereof.

9. A method of increasing the abrasion resistance and chemical durability of a glass article comprising applying to the surface of said article while at an elevated temperature an aqueous solution of about 2 to about 50 weight percent of a coordination compound, said compound being represented by the formula Y_2MX_6 wherein Y is an alkali metal, hydrogen or ammonium, M is titanium, tin or zirconium and X is a halogen, the temperature of the glass being sufficient to immediately and substantially completely vaporize the water content of said solution and above the decomposition temperature of said coordination compound, and thereafter annealing said article so treated at a temperature of at least about 425° C., to thereby decompose said coordination compound on the surface of said glass article and thereafter applying to said annealed article an organic material selected from the group consisting of polyethylene, polypropylene, polystyrene, polyurethane, and fatty acids and their derivatives.

14. A method of increasing the abrasion resistance and chemical durability of a glass article comprising contacting the surface of said article while at an elevated temperature with an aqueous solution of between about 2 to about 50 weight percent of a coordination compound selected from the group consisting of $(NH_4)_2TiCl_6$, $(NH_4)_2TiF_6$, Na_2TiCl_6, Na_2TiF_6, K_2TiCl_6, K_2TiF_6, $(NH_4)_2SnCl_6$, $(NH_4)_2SnF_6$, Na_2SnCl_6, Na_2SnF_6, K_2SnCl_6, K_2SnF_6, $(NH_4)_2ZrCl_6$, $(NH_4)_2ZrF_6$, Na_2ZrCl_6, Na_2ZrF_6, K_2ZrCl_6, K_2ZrF_6, H_2TiCl_6, H_2TiF_6, H_2SnCl_6, H_2SnF_6, H_2ZrCl_6 and H_2ZrF_6, the temperature of the glass being sufficient to immediately and substantially completely vaporize the water content of said solution, the temperature of the glass being at least about 425° C., and above the decomposition temperature of said coordination compound, and thereafter annealing said article so treated at a temperature of at least about 590° C., to thereby decompose said coordination compound on the surface of said glass article, and thereafter applying to said annealed article with an organic material selected from the group consisting of polyethylene, polypropylene, polystyrene, polyurethane, and fatty acids and their derivatives.

4,232,066
METHOD AND APPARATUS FOR DIPPING METAL FENCE POSTS

Joel B. Stevens, McMinnville, and Mark C. Wirfs, Beaverton, both of Oreg., assignors to Cascade Steel Rolling Mills, Inc., McMinnville, Oreg.

Filed Aug. 31, 1978, Ser. No. 938,704

Int. Cl.[3] B05C *13/00*

U.S. Cl. 427—430.1 **11 Claims**

1. In a machine for dipping fence posts without interrupting the continuous flow of such posts along a predetermined path in a predetermined direction,

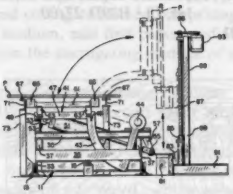
said machine comprising traveling means interposed in a gap in said flow of posts,

said traveling means having means for picking up a group of posts in horizontal positions, elevating such posts to a vertical dipping position, dipping said posts and then returning them back to horizontal, and depositing them in said flow path,

power means for driving said traveling means in said predetermined direction at a faster rate of speed than that of said

rate of flow to advance said group beyond the positions they would occupy if left in said flow,

said power means causing the traveling means to return in the opposite direction for picking up a second group of posts to be dipped,



said power means operating at a speed such that the time for completion of a cycle of its travel is not greater than the time necessary for a group of posts in said flow path to move from one space into the next adjacent space.

4,232,067

RECONSOLIDATED WOOD PRODUCT

John D. Coleman, Surrey Hills, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

Continuation of Ser. No. 787,735, Apr. 15, 1977, abandoned. This application Oct. 26, 1978, Ser. No. 954,949

Claims priority, application Australia, Apr. 15, 1976, PC5622

Int. Cl.[2] B05D *3/12;* **B27M** *1/02, 1/08;* **B32B** *21/14, 31/20*

U.S. Cl. 428—17 **26 Claims**

1. Reconsolidated wood product including at least one flexible open lattice work web of naturally interconnected wood strands, said strands extending substantially parallel to each other in the direction of the grain of the natural wood and a bonding agent bonding together said strands which have been consolidated to substantially their original orientation.

8. Process for forming a reconsolidated wood product consisting substantially of the steps of rending natural wood to form a flexible open lattice work web of substantially parallel aligned, naturally interconnected strands, compressing the web to consolidate the strands and bonding said strands together.

4,232,068

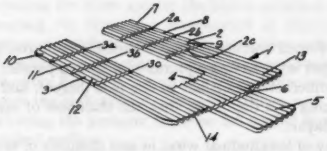
SHIM

Thomas L. Hoh, 8311 Gaines Rd., Cincinnati, Ohio 45239, and Robert H. Relly, 3051 Kirklevington Dr., Apt. 72, Lexington, Ky. 40502

Filed Jan. 2, 1979, Ser. No. 20

Int. Cl.[3] B32B *3/30, 3/26*

U.S. Cl. 428—43 **9 Claims**



1. A shim for use as a spacing device between two adjacent elements, said shim comprising a planar, U-shaped structure of uniform thickness with parallel leg portions and a connecting base portion, said shim having parallel upper and lower surfaces, said upper and lower surfaces of said shim being longitudinally striated so as to form longitudinal, parallel, narrow, alternate grooves and ridges therein, whereby two or more of said shims may be stacked to achieve a desired shim thickness with said alternate grooves and ridges of said upper and lower surfaces of adjacent shims nesting to prevent lateral shifting of said stacked shims with respect to each other, and a handle portion on said shim, said handle portion being coplanar with said shim leg and base portions, said handle portion being located centrally of said base portion and extending therefrom in a direction opposite said leg portions.

4,232,069

IMPACT RESISTANT COMPOSITE STRUCTURE

Leo J. Windecker, Midland, Tex., assignor to International Harvester Company, Chicago, Ill.

Filed Apr. 16, 1979, Ser. No. 30,208

Int. Cl.[2] B32B *3/10, 3/14*

U.S. Cl. 428—47 **6 Claims**

1. An impact resistant composite structure comprising:

(a) a base portion having a plurality of plys of high tensile strength fibrous sheets impregnated with an adhesive elastic resin;

(b) a facing portion bonded to said base portion and comprising a plurality of closely spaced tiles having a Rockwell hardness of thirty and embedded in a layer of adhesive elastic resin having a suspended mixture of polymeric microspheres of more than 2 percent in weight relative to the quantity of adhesive elastic resin, said layer of said adhesive elastic resin being at least three times the thickness of said tiles and said tiles being mounted in a plane that generally extends along the centerline of said adhesive elastic resin; and

(c) said facing portion including a facing surface having a plurality of layers of high tensile strength fibrous sheets impregnated with an adhesive elastic resin.

4,232,070

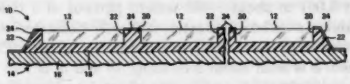
NON-ARCING DIELECTRIC MODULAR ARRAY

George T. Inouye, Ranchos Palos Verdes; Nathaniel L. Sanders, Anaheim, and Winston C. Moss, Palos Verdes Estate, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Nov. 7, 1978, Ser. No. 958,591

Int. Cl.[2] B32B *3/14*

U.S. Cl. 428—49 **8 Claims**



1. In combination:

a mounting substrate,

a dielectric element mounted on said substrate having an outer surface spaced from said substrate which tends to accumulate a high electrical charge relative to said substrate in a plasma environment and thereby induce arc discharge between said surface and substrate, and

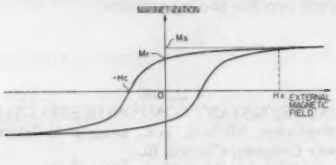
resilient electrically conductive means about the edges of said element disposed in electrically conductive relation to said element surface and grounded to said substrate to provide an electrically conductive path about said element for bleeding electrical charges from said surface to said substrate and thereby suppressing said arc discharges.

4,232,071

METHOD OF PRODUCING MAGNETIC THIN FILM

Akira Terada, Mito; Seizi Hattori, Tomobe; Yoshikazu Ishii; Akira Nohara, both of Mito; Nobuo Inagaki, Katsuta; Wakatake Matsuda, Zama, and Susumu Kawakami, Tama, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo and Fujitsu Limited, Kawasaki, both of, Japan

Filed Jun. 29, 1977, Ser. No. 811,294
Claims priority, application Japan, Jul. 1, 1976, 51-78611
Int. Cl.[2] H01F *10/02*
U.S. Cl. 428—64 9 Claims



1. In a method of producing a γ-Fe_2O_3 continuous thin film magnetic disk medium wherein a deposition source is deposited on an opposed aluminum alloy substrate by means of a reactive vacuum deposition and the film thus formed thermally treated to form the γ-Fe_2O_3 magnetic disk medium, the improvement comprising employing as the deposition source a ferroalloy comprising from about 1 to about 10 at.% titanium, from about 0.5 to about 5 at.% cobalt, and from about 85 to about 98.5 at.% iron.

9. In a magnetic disk medium comprising a continuous Fe_2O_3 thin film on an aluminum alloy substrate the improvement, wherein said film comprises from about 1 to about 10 at.% titanium, from about 0.5 to about 5 at.% Co and from about 85 to about 98.5 at.% iron.

4,232,072

PROTECTIVE COMPOSITIONS FOR RECORDING

Robert P. Pardee, Boulder, Colo., assignor to Ball Corporation, Muncie, Ind.

Continuation-in-part of Ser. No. 722,174, Sep. 10, 1976, Pat. No. 4,096,079. This application Jun. 14, 1978, Ser. No. 915,629
Int. Cl.[2] G11B *5/70*; C10M *1/32*; G11B *5/72*; B32B *3/02*
U.S. Cl. 428—65 9 Claims

1. A composition for imparting lubricity and wear resistance to a surface having dynamic presentations thereon comprising about 0.001 to about 3.000 weight percent of a composition containing a carboxylate ester, said ester being derived from a perfluoroalkyl alcohol of the formula $C_nF_{2n+1}(CH_2)_mOH$ wherein n is from about 3 to about 14 and m is 1 to 3 and an aliphatic carboxylic acid having about 3 to 30 carbon atoms, and an antistatic agent selected from the group consisting of amines, fatty quaternary ammonium compounds, fatty acid esters, phosphate esters and ethoxylated compounds, and about 97.00 to about 99.999 weight percent of a solvent therefor.

9. A phonograph record having deposited over the playing surface of said phonograph record a composition comprising a carboxylate ester derived fluoroalkanols having the formula $C_nF_{2n+1}(CH_2)_mOH$ wherein n is from about 3 to about 14 and m is 1 to 3, and an aliphatic acid selected from the group consisting of monocarboxylic acid and polycarboxylic acids, said acid having about 3 to 30 carbon atoms, and an antistatic agent selected from the group consisting of amines, fatty quaternary ammonium compounds, fatty acid esters, phosphate esters and ethoxylated compounds.

4,232,073

FIBROUS SHEET MATERIALS RESEMBLING A DEER SKIN AND PROCESS FOR PREPARING SAME

Miyoshi Okamoto, Takatsuki, Japan, assignor to Toray Industries, Inc., Tokyo, Japan

Continuation-in-part of Ser. No. 831,047, Sep. 6, 1977, Pat. No. 4,127,696, which is a continuation-in-part of Ser. No. 745,161, Nov. 26, 1976, abandoned. This application Sep. 15, 1978, Ser. No. 942,806
Claims priority, application Japan, Jun. 17, 1976, 51-70379
Int. Cl.[2] B29D *27/00*
U.S. Cl. 428—91 9 Claims

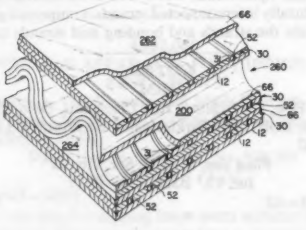
1. A sheet-like material comprising bundles of mixed extra fine fibers having approximately quadrilateral to nonagonal cross-sections, in which bundles each extra fine fiber is surrounded by other extra fine fibers, a majority of the fibers positioned at the inside portion have cross-sections of a greater number of angles than the number of angles of the cross-sections of the fibers positioned at the outside portion and each extra fine fiber has peripheral surfaces to be faced approximately parallel, in a coherent state to the peripheral surfaces of the other extra fine fibers adjacent to said each extra fine fiber, said sheet-like material having, on the surface thereof, raised fibers composed of protruding ends of the extra fine fibers and having a polymeric binder material impregnated therein, said sheet-like material being of the group consisting of non-woven and knitted sheet-like materials.

4,232,074

REINFORCED PAPER PRODUCT AND METHOD FOR THE MANUFACTURING THEREOF

Marc A. Chavannes, 4044 Roberts Point, Sarasota, Fla. 33581

Continuation-in-part of Ser. No. 599,142, Jul. 25, 1975. This application Feb. 15, 1978, Ser. No. 878,158
Int. Cl.[2] B32B *3/28, 5/10*
U.S. Cl. 428—110 38 Claims



1. A reinforced corrugated paper laminate comprising:

a first paper layer having a plurality of spaced parallel channels formed on the surface of one face thereof, said channels being of a depth less than the thickness of said first paper layer;

a plurality of longitudinal wires in said channels of said first paper layer, the depth of said channels corresponding to the thickness of said longitudinal wires disposed therein, and the width of each of said channels corresponding to

the total thickness of said wires disposed therein, and said channels having a cross-sectional area greater than the cross-sectional area of said wires disposed therein;

a second paper layer adhesively secured to said surface of said first paper layer having said channels formed thereon to hold said plurality of wires in place between said first paper layer and said second paper layer to form a wire reinforced paper laminate; and

said wire reinforced paper laminate being corrugated transversely of said longitudinal wires.

6. A reinforced corrugated board comprising:

a first paper medium, said first paper medium being corrugated to form the corrugating medium of said corrugated board;

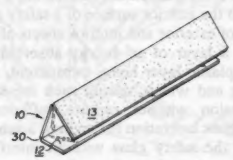
a second paper medium forming an outer facing of said corrugated board, said second paper medium being adhered to the crests of one side of said corrugated first paper medium to form said corrugated board; and

at least said first paper medium being a wire reinforced medium, each wire reinforced medium being comprised of a first paper layer having a plurality of spaced parallel channels formed on the surface of one face thereof, said channels being of a depth less than the thickness of said first paper layer; a plurality of longitudinal wires in said channels of said first paper layer, the depth of said channels corresponding to the thickness of said longitudinal wires disposed therein and the width of each of said channels corresponding to the total thickness of said wires disposed therein, and said channels having a cross-sectional area greater than the cross-sectional area of said wires disposed therein; and a second paper layer adhesively secured to said surface of said first paper layer having said channels formed thereon to hold said plurality of wires in place between said first paper layer and said second paper layer.

4,232,075
PLASTIC MIRROR ARTICLE AND METHOD OF MAKING SAME

William A. Gantz, and David M. Gantz, both of Berkeley, Calif., assignors to Gantec Corporation, Emeryville, Calif.

Filed Dec. 19, 1978, Ser. No. 970,909
Int. Cl.² G02B *5/08*; B32B *31/18, 31/20*
U.S. Cl. 428—124 **12 Claims**



1. A method of forming an optical quality smooth surface on a high impact polystyrene sheet having first and second surfaces comprising the steps of:

(a) placing the first surface of the sheet in contact with a master having a highly polished surface;

(b) pressing the sheet against the highly polished surface;

(c) heating the sheet to a temperature at which the high impact polystyrene flows while maintaining the pressure between the sheet and the highly polished surface;

(d) allowing the sheet to cool to a temperature below that at which the high impact polystyrene flows; and

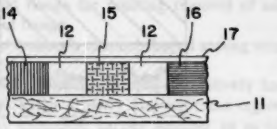
(e) releasing the pressure between the cooled sheet and the polished surface.

10. An article having a mirrored surface comprising a high impact polystyrene sheet having a press polished first surface and a reflective coating deposited thereon.

4,232,076
METHODS OF OBTAINING DEEP THROUGH PENETRATION OF COLORANTS INTO POLYVINYL CHLORIDE COMPOSITIONS, AND THE RESULTING PRODUCTS

John R. Stetson, Lebannon; Alan A. Graham, Mercerville, both of N.J., and Rudolf Frisch, Yardley, Pa., assignors to Congoleum Corporation, Kearny, N.J.

Filed Nov. 13, 1978, Ser. No. 960,402
Int. Cl.² B32B *3/12, 5/16*
U.S. Cl. 428—158 **16 Claims**



1. A method of obtaining deep through penetration into firmed printable gelled plastisol or sintered dry-blend polyvinyl chloride compositions which comprises: applying a transfer paper or other release surface coated with a low energy, sublimable disperse dye having a molecular weight of from about 200 to about 400 to the surface of a firmed, printable gelled plastisol or sintered dry-blend polyvinyl chloride composition prepared from polyvinyl chloride resin in finely divided particulate form having a particle size of from about 0.5 micron to about 420 microns, from about 25 parts to about 150 parts of plasticizer per one hundred parts of polyvinyl chloride resin, and from about 0.4 parts to about 10 parts of a heat stabilizer per one hundred parts of polyvinyl chloride resin, said low energy, sublimable disperse dye being in direct, intimate contact with said polyvinyl chloride composition; applying heat to said polyvinyl chloride composition and said low energy sublimable disperse dye having a molecular weight of from about 200 to about 400 in the range of from about 300° F. to about 470° for a period of time of from about 6 seconds to about 20 seconds, whereby said low energy, sublimable disperse dye sublimes and, while in the vapor phase, penetrates into said firmed printable gelled plastisol or sintered dry-blend polyvinyl chloride composition and said polyvinyl chloride resin is substantially completely fused by being substantially completely solvated with said plasticizer; and removing said transfer paper or other release surface after said low energy, sublimable disperse dye has penetrated into said firmed, printable gelled plastisol or sintered dry-blend polyvinyl chloride composition and said polyvinyl chloride resin has been fused.

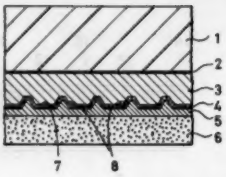
10. A resinous polymer sheet material comprising: a layer of a fused polyvinyl chloride resin composition prepared from a finely divided particulate polyvinyl chloride resin having an average particle size in the range of from about 0.5 micron to about 420 microns, from about 25 parts by weight to about 150 parts by weight of a plasticizer per 100 parts by weight of said polyvinyl chloride resin, and from about 0.4 parts by weight to about 10 parts by weight of a heat stabilizer per 100 parts by weight of said polyvinyl chloride resin, said polyvinyl chloride resin being substantially completely fused by being substantially completely solvated with said plasticizer; and a colored pattern or design of a low energy sublimable disperse dye having a molecular weight of from about 200 to about 400 printed on the surface of and extending deeply through said layer of polyvinyl chloride resin composition, said colored pattern or design of a low energy sublimable disperse dye having a molecular weight of from about 200 to about 400 being formed on the underside face of a heat transfer release substrate and directly and intimately contacting the surface of said layer of a polyvinyl chloride resin composition.

4,232,077

HOT-STAMPING FILM, AND PROCESS AND APPARATUS FOR ITS MANUFACTURE

Fritz Meisel, Sudweg 60, D-8510 Furth, Bayern, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 833,914, Sep. 16, 1977, abandoned. This application Feb. 22, 1979, Ser. No. 14,025
Int. Cl.[3] B32B *3/00*; B44C *1/24*; C09J *7/02*
U.S. Cl. 428—174 9 Claims



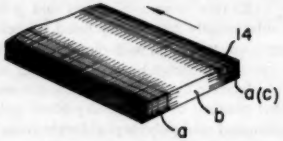
1. A hot-stamping film comprising a carrier film, a transparent covering lacquer layer having a smooth surface adjacent to the carrier film and being provided on its surface facing away from said carrier film with a spatial pattern, a decorative layer contacting the surface of the transparent covering lacquer layer provided with the spatial pattern, and an adhesive layer, optionally with a separating layer between the carrier film and the covering lacquer layer and optionally with an adhesion-promoter layer between the decorative layer and the adhesive layer.

4,232,078

MULTI-COLORED SYNTHETIC RESIN SHEET

Isao Kamada, Otake, Japan, assignor to Mitsubishi Rayon Company, Limited, Tokyo, Japan

Filed Oct. 13, 1978, Ser. No. 951,086
Int. Cl.[2] B32B *27/00*
U.S. Cl. 428—195 26 Claims



1. A multi-colored synthetic resin sheet having an upper surface, a lower surface, and a uniformly colored longitudinal cross-section, which has at least two longitudinally adjacent different colors with a boundary portion therein between, with the boundary portion between said colors being in a gradated state on the upper surface, on the lower surface and throughout a transversal cross-section of said sheet.

8. A method of producing a multi-colored synthetic resin sheet which comprises:

adjacently feeding onto a moving belt at least two differently colored liquids comprising polymerizable monomer;

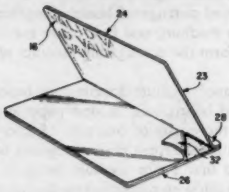
polymerizing and hardening said liquids; thereby obtaining a multi-colored synthetic resin sheet which has an upper surface, a lower surface, and a uniformly colored longitudinal cross-section, which has at least two longitudinally adjacent colors with the boundary portion between said colors being in a gradated state on the upper surface, on the lower surface, and throughout a transversal cross-section of said sheet.

4,232,079

NOVEL I.D. CARDS

Thomas Raphael, Winchester, and Joseph Shulman, Hyde Park, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 755,684, Dec. 30, 1976, Pat. No. 4,151,666. This application Mar. 19, 1979, Ser. No. 21,580
Int. Cl.[2] B32B *3/00*, *5/16*; G09F *3/02*
U.S. Cl. 428—195 15 Claims



1. A protective laminar assembly for lamination to an information-bearing document, said assembly comprising a plastic sheet material having an adherent capability and a verification pattern of a light-transmissive pigment material having an average particle size between about 1 to about 25 microns and a dry brightness value of no greater than about 95 integrated with said sheet material or said adherent capability.

4,232,080

SAFETY WINDOW COMPRISING SELF-HEALING POLYMERIC LAYER

Roger Orain, Vaucresson, France; Hans Heuser; Hans Ohlenforst, both of Aachen, Fed. Rep. of Germany, and Rudolf Pelzer, Herzogenrath, Fed. Rep. of Germany, assignors to Saint-Gobain Industries, Neuilly-sur-Seine, France

Continuation of Ser. No. 369,087, Jun. 11, 1973, abandoned. This application Mar. 10, 1977, Ser. No. 776,214
Claims priority, application Fed. Rep. of Germany, Jun. 9, 1972, 2228299
Int. Cl.[2] B32B *17/10*, *27/40*; C03C *17/32*, *27/12*
U.S. Cl. 428—215 19 Claims

1. Safety glass characterized by its ability to protect against broken glass laceration and by its ability to absorb the energy of an object impacting against the safety glass throughout a substantial plastic deformation occurring during such impact, said safety glass being transparent and having an elastic plastic layer adhered to the interior surface of a safety glass construction composed of exterior and interior sheets of glass between which there is a layer of an energy absorbing plastic, said interior elastic plastic layer being transparent, anti-lacerative and self-healing and which, during such impact, exhibits an elastic deformation without rupture sufficient to protect against broken glass laceration throughout a substantial plastic deformation of the safety glass without interfering substantially with the energy absorption of said energy absorbing plastic, said elastic plastic layer having an elongation to rupture in excess of 60% with less than 2% plastic deformation and a modulus of elasticity below 2000 daN/cm^2.

11. A transparent, scratch-resistant, laminated safety windshield for use in a vehicle, characterized by its ability to protect an occupant of the vehicle from broken glass laceration and by its ability to absorb energy throughout a substantial windshield plastic deformation occurring during crash impact of the occupant against the windshield, said windshield having two transparent glass sheets, one of which is of a thickness of 3 to 4 mm, and the other is of a thickness of 2 to 3 mm and is adapted to face the interior of the vehicle, and having two transparent plastic sheets, one of which plastic sheets is an energy-absorbing thermoplastic sheet of poly(vinyl butyral) sandwiched between and adhesively bonding said glass sheets and is of a thickness of at least 0.76 mm, and the other of which plastic sheets is an anti-lacerative, self-healing weakly reticulated

aliphatic polyurethane sheet of a thickness between 0.1 and 1 mm and adhered to said other glass sheet, said sheet of polyurethane having an elongation to rupture in excess of 60% with less than 2% plastic deformation and a modulus of elasticity below 2000 daN/cm^2 and exhibiting, during such impact, an elastic deformation, without rupture, sufficient to protect against broken glass laceration without interfering substantially with the energy absorption of said energy absorbing sheet of poly(vinyl butyral).

15. A process involving a new use for a known material in which the known material is used in the fabrication of a transparent, laminated, safety glass for use in a vehicle, the safety glass being composed of interior and exterior transparent glass sheets bonded together by a transparent, energy-absorbing plastic sheet capable of absorbing the energy of an object, impacting against either surface of the safety glass, by essentially plastic deformation occurring throughout a substantial path of travel of said object, the known material being a self-healing and transparent plastic, and having a high capacity for elastic deformation including an elongation to rupture in excess of 60% with less than 2% plastic deformation and a modulus of elasticity below 2000 daN/cm^2, said process comprising adhering said known material to the interior surface of the interior glass sheet to provide said interior glass sheet with a self-healing, plastic layer which, during impact, exhibits an elastic deformation, without rupture, sufficient to protect against broken glass laceration without interfering substantially with the energy absorption of said energy absorbing plastic sheet.

4,232,081

EDGE PROTECTOR TRIM STRIP

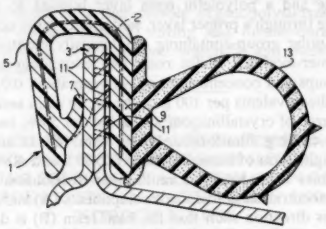
Ronald E. Pullan, Leeds, England, assignor to Schlegel (U.K.) Limited, Leeds, England

Continuation of Ser. No. 570,518, Apr. 22, 1975, abandoned, which is a continuation-in-part of Ser. No. 519,107, Oct. 30, 1974, abandoned. This application Oct. 27, 1977, Ser. No. 846,242

Claims priority, application United Kingdom, Apr. 24, 1974, 17886/74

Int. Cl.^{2} E06B *7/18, 7/22;* E04F *19/02;* B32B *15/06*

U.S. Cl. 428—217 **30 Claims**



1. A one-piece edge protector trim strip for application to an applied position on a flange such as that found around door openings on motor vehicles, said strip having a body of polymeric material of generally U-shaped cross section having a pair of opposed first and second arms having inner opposed first and second surfaces respectively, wherein the improvement comprises:

(a) a first gripper fin of a first deformable polymeric material on said inner first surface of said first arm of said U-shaped body, said first gripper fin extending generally along the length of said strip and projecting toward said inner second surface; and

(b) a plurality of second gripper fins of a second deformable polymeric material softer than said first deformable polymeric material on said inner second surface of said second arm of said U-shaped body, said second gripper fins extending generally along the length of said strip and projecting toward said inner first surface;

whereby when said edge protector trim strip is applied on a flange, said first gripper fin engages and deforms a certain amount against one surface of said flange causing said opposite surface of said flange to engage and deform said second gripper fins a greater amount whereby said more greatly deformed second gripper fins (1) serve to accommodate flanges of different thicknesses, (2) form a good water seal between said opposite surface of said flange and said second gripper fins, and (3) present increased anti-sliding friction surfaces in engagement with said opposite surface of said flange for resisting removal of said film strip from said flange.

29. A method of making a channel-shaped sealing strip comprising the steps of

extruding flexible covering material in relatively hard and relatively soft forms directly onto different regions of a longitudinally extending carrier member so as together they completely cover one surface thereof and join along a line extending longitudinally of that surface, the lateral edges of the carrier member and at least the marginal regions of the other surface of the carrier member being also directly covered by the extruded flexible covering material, at least part of this material being in the relatively soft form,

the material in the relatively soft form on the said one surface additionally being extruded to provide a beading extending longitudinally of the carrier member parallel to the said line,

the material on the said other surface additionally being extruded to provide ribs extending longitudinally of the carrier member parallel to the said line,

the said regions being such that, with the carrier member shaped into channel form, the outside surface of one side wall of the channel so formed is covered by the material in the relatively soft form, the beading runs along this outside surface, the outside surface of the other side wall of the channel is covered by the material in the relatively hard form, and the gripping ribs run along the inside surfaces of the side walls of the channel.

4,232,082

ANTI-ELECTROSTATICALLY GUARDED WORSTED SUITING

Hiroshi Noritake, Takarazuka, Japan, assignor to Nippon Keori Kabushiki Kaisha, Kobe, Japan

Filed Jul. 11, 1979, Ser. No. 56,521

Int. Cl.^{2} B32B *5/16*

U.S. Cl. 428—225 **6 Claims**

1. An anti-electrostatically guarded worsted suiting woven or knitted partly of an electroconductive core-spun yarn and mostly of a non-electroconductive core-spun yarn, which comprises

0.03% to 1.0% carbon-black-coated mono-filament fiber of synthetic polymer contained as a core in the electroconductive yarn and more than 35% wool fiber contained both in the electroconductive yarn and in the non-electroconductive yarn,

the electroconductive yarn having as a covering for the mono-filament fiber wool-included fibers of which an aggregate amount is above the fivefold amount of the latter, and being laterally, longitudinally or crosswise equidistantly combined in the suiting,

the wool-included fibers having the average single-fiber finess thereof equal to or less than the one-fifth finess of the mono-filament fiber,

the non-electroconductive yarn including as a core polyester multi-filament fibers.

4,232,083

IMAGING COMPOSITIONS AND METHODS

Donald D. Buerkley, Woodbury; Norman P. Sweeny, North Oaks, and Daniel N. Vivona, Lake Elmo, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jul. 22, 1975, Ser. No. 597,998
Int. Cl.[2] B32B 3/16
U.S. Cl. 428—307 28 Claims

1. A color-forming precursor composition comprising an organic color-forming, metal-complexing compound having a plurality of ligand groups and an organic cosolvent for said compound, said compound having the formula

$$R^1(L)_n$$

wherein

n is a number from 2 to about 100,

L is a metal-complexing ligand group, and

R^1 is a polyvalent organic group having a valence of n, provided that when n is 2 or 3 and R^1 is a fatty hydrocarbon group, R^1 contains about 34 and 51 carbon atoms respectively,

said compound being capable of complexing with transition metal ions to form metal-containing colored products which are substantially insoluble in organic cosolvents for said compound.

15. A sheet-like substrate having at least a portion of one major surface coated with the color-forming precursor composition of claim 1.

16. A method of providing a dark, permanent image on a sheet-like substrate comprising

(a) coating at least a portion of one major surface of said substrate with the color-forming precursor composition of claim 1; and

(b) contacting a color-activating composition with a transfer means and subsequently contacting said substrate surface with said transfer means whereby said color-activating composition is brought into contact with said color-forming precursor composition and a dark, permanent image is formed on said substrate.

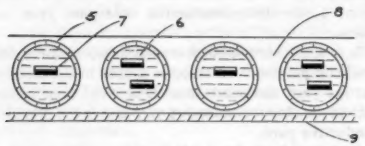
17. A method according to claim 16, wherein said transfer means is a portion of a human body.

4,232,084

SHEETS CONTAINING MICROENCAPSULATED COLOR-CODED MICROMAGNETS

Clarence R. Tate, Fairfield, Ill., assignor to Thalatta, Inc., Fairfield, Ill.

Continuation-in-part of Ser. No. 777,180, Mar. 14, 1977, abandoned, which is a continuation-in-part of Ser. No. 775,202, Mar. 7, 1977, abandoned. This application Jan. 25, 1978, Ser. No. 872,214
Int. Cl.[2] B32B 3/26, 5/18
U.S. Cl. 428—309 3 Claims



1. A sheet comprising a hardened transparent film-forming binder and hardened transparent individual microcapsules dispersed in said binder, each microcapsule including a shell wall composed of a material different than the material of said binder, said microcapsules being prepared and completed prior to dispersion in said binder and containing viewable, magnetically responsive, color-coded micromagnets having a constant magnetization vector rotatably dispersed in a liquid, said micromagnets being selected in size from the range of about 25 microns to about 1000 microns, said shell wall surrounding said liquid and forming a barrier wall between said liquid and said binder.

4,232,085

FLEXIBLE POLYURETHANE FOAM HAVING A LOW FLAME SPREAD INDEX

William L. Carlstrom, and Gary L. Maechtle, both of West Bend, Wis., assignors to Freeman Chemical Corporation, Port Washington, Wis.

Continuation-in-part of Ser. No. 930,412, Aug. 2, 1978, abandoned. This application Aug. 14, 1979, Ser. No. 66,448
Int. Cl.[3] B32B 5/20; C08G 18/14; B32B 27/40
U.S. Cl. 428—315 11 Claims

6. A foam-forming composition for producing an integral-skinned, flexible polyurethane foam having a low flame spread rating comprising:

organic polyol consisting preponderantly of diol and/or triol;

a foam-forming catalyst;

halogenated alkane blowing agent;

at least 75% (based upon the weight of said polyol) of pentabromoethyl benzene; and

sufficient organic polyisocyanate, consisting predominantly of diisocyanate, to combine stoichiometrically with the said polyol to produce a flexible polyurethane foam.

7. An integral-skinned polyurethane foam having a density of 10 to 50 pounds per cubic foot; having an integral-skin; fabricated by forming a polyurethane foam from the composition of claim 6 in an enclosed mold.

4,232,086

POLYOLEFIN-METAL BONDED STRUCTURES AND PROCESS FOR PREPARING SAME

Fumio Mori, Yokohama; Isao Ichinose, Hiratsuka, and Go Kunimoto, Fujisawa, all of Japan, assignors to Toyo Seikan Kaisha, Ltd., Tokyo, Japan

Filed Nov. 15, 1978, Ser. No. 960,931
Claims priority, application Japan, Nov. 12, 1977, 52137259
Int. Cl.[2] B65D 41/12; B32B 31/06; B05D 1/36
U.S. Cl. 428—341 17 Claims

1. A polyolefin-metal bonded structure comprising a metal substrate and a polyolefin resin layer bonded to the metal substrate through a primer layer, said primer layer comprising:

(a) a polar group-containing ethylenically unsaturated monomer-modified olefin resin (A) containing said polar groups at a concentration of between about 0.01 and 200 milliequivalents per 100 g of the olefin resin and having a degree of crystallinity of at least about 50%; and

(b) a coating film-forming base resin (B) at an (A)/(B) weight ratio of between about 0.2/99.8 and 40/60,

said primer layer having a multi-layer distribution structure with concentration gradients of components (A) and (B) in the thickness direction such that the base resin (B) is distributed predominantly in the portion of the primer layer contiguous to the surface of the metal substrate and the modified olefin resin (A) is distributed predominantly in the portion of the primer layer contiguous to the polyolefin layer, wherein when said primer layer is divided into three sub-layers with respect to the thickness direction, the distribution ratio, Dx, defined by the following formula:

$$D_x = 10000\ W_X/(W)(C_A)$$

wherein W is the weight of the primer layer per unit surface area (mg/dm^2), C_A is the average % by weight of the modified olefin resin in the primer layer, and W_X is the weight per unit area (mg/dm^2) of the modified olefin resin in each sub-layer, being at least about 50% in the sub-layer, L_S, contiguous to the polyolefin layer and not higher than about 10% in the sub-layer, L_B, contiguous to the surface of the metal substrate.

4,232,087

METHOD OF COATING ORGANIC FIBERS WITH POLYTETRAFLUOROETHYLENE

Elwood G. Trask, Auburn, Me., assignor to Albany International Corp., Albany, N.Y.

Filed Aug. 3, 1978, Ser. No. 930,805
Int. Cl.[3] B32B 27/34; D02G 3/36
U.S. Cl. 428—389 9 Claims

1. A method of improving the acid resistance, hydrophobicity, oleophobicity and soil release properties of synthetic, organic fibers, which comprises;

coating the fibers with polytetrafluoroethylene particles, in the presence of water and a water soluble, chromium complex of a long chain fluorochemical characterized in part by a molecular structure which consists of a polar end and a non-polar fluorocarbon end which is both organophobic and hydrophobic.

4,232,088

POLYCARBONATE ARTICLES COATED WITH AN ADHERENT, DURABLE ORGANOPOLYSILOXANE COATING AND PROCESS FOR PRODUCING SAME

James S. Humphrey, Jr., Clemmons, N.C., assignor to General Electric Company, Pittsfield, Mass.

Continuation-in-part of Ser. No. 895,789, Apr. 12, 1978, abandoned. This application Apr. 2, 1979, Ser. No. 26,059
Int. Cl.[2] B05D 3/06, 1/38; B32B 27/08, 27/16
U.S. Cl. 428—412 29 Claims

18. A process for producing a uniformly and tenaciously adhered scratch resistant, mar resistant, abrasion resistant, and organic solvent resistant thermoset organopolysiloxane containing coating on at least one surface of a polycarbonate substrate which comprises: (i) applying onto at least one surface of said polycarbonate substrate an ultraviolet light curable primer composition containing (a) at least one polyfunctional acrylic acid ester monomer; (b) at least one organic silicon compound containing at least one organic group having olefinic unsaturation; (c) at least one acrylate modified polymer selected from the group consisting of acrylated urethanes, acrylated alkyl urethanes, acrylated polycaprolactones, acrylated unsaturated acid modified drying oils, acrylated polyesters, and acrylated polyethers; and (d) a photoinitiator; (ii) curing said primer composition by means of ultraviolet light; (iii) applying an organopolysiloxane top coating composition containing a further-curable organopolysiloxane onto said cured primer; and (iv) curing said further-curable organopolysiloxane to a thermoset condition and thereby producing said coating.

4,232,089

POLYOLEFIN FILMS WITH A HIGH RESISTANCE TO STICKING AGAINST WELDING BARS HAVING A TOP COATING COMPRISING A COMBINATION OF AN EPOXY RESIN, AN ACRYLIC RESIN AND NITROCELLULOSE

Fosco Bordini, and Luigi Mauri, both of Terni, Italy, assignors to Moplefan S.p.A., Milan, Italy

Filed Oct. 23, 1978, Ser. No. 953,875
Claims priority, application Italy, Oct. 24, 1977, 28895 A/77
Int. Cl.[2] B32B 27/38
U.S. Cl. 428—413 16 Claims

1. Films of a polyolefin consisting essentially of isotactic macromolecules and carrying on at least one surface thereof a coating constituted by two layers, a first layer consisting of an alkylenimine polymer or a low molecular weight polyamine and a second layer consisting of a mixture of, by weight:

(a) 10–30% of an epoxy resin;

(b) 30–70% of an acrylic or methacrylic polymer or copolymer; and

(c) 10–40% of nitrocellulose having a nitrogen content between 11.5 and 12.5%.

said coated film being readily thermoweldable and showing improved resistance to sticking to the bars of welding machines, without loss of their optical properties, as compared to the uncoated polyolefin films.

4. Process for improving the weld-resistance and resistance to sticking to the welding bars of a polyolefinic film, without altering its optical properties, which comprises applying to said film a first coating consisting of an alkylenimine polymer or a low molecular weight polyamine, and thereafter applying over the first coating a second coating consisting of a mixture of, by weight:

(a) 10–30% of epoxy resins;

(b) 30–70% of acrylic or methacrylic polymers or copolymers; and

(c) 10–40% of nitrocellulose having a nitrogen content between 11.5 and 12.5%.

4,232,090

SEALERLESS PRIMERS

Martin J. Simon, Natrona Heights, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 348,771, Apr. 6, 1973, which is a continuation-in-part of Ser. No. 156,923, Jun. 25, 1971, abandoned, which is a continuation-in-part of Ser. No. 887,333, Dec. 22, 1969, abandoned. This application Apr. 30, 1979, Ser. No. 34,514
Int. Cl.[2] B05D 3/02; B32B 5/16, 9/00, 17/00
U.S. Cl. 428—424.4 8 Claims

1. An article comprising a metal substrate having adhered thereto a hard, crack-resistant coating, said coating comprising a layer of cured primer composition adhering to said metal substrate and a layer of an acrylic polymer superimposed upon and adhering to said cured primer composition, wherein said cured primer composition is a mixture of

a. a saturated resin which is a saturated polyester having hydroxyl functionality, a saturated polyether having hydroxyl functionality or a saturated polyurethane having hydroxyl functionality, and which has been cured with an aminoplast curing agent produced from the condensation products of amines or amides with an aldehyde, to form a thermoset polymer, and

b. a thermoplastic acrylic polymer which

(1) is selected from the group consisting of addition polymers of esters of alpha-beta ethylenically unsaturated acids and interpolymers of esters of alpha-beta ethylenically unsaturated acids with other ethylenically unsaturated compounds,

(2) is essentially uncured with said aminoplast curing agent, and

(3) is soluble in solvents in which it was soluble before said primer composition was cured.

4,232,091

COMPOSITE MATERIALS AND THEIR PRODUCTION

Rex W. Grimshaw, Rawdon, and Colin Poole, Castleford, both of England, assignors to Hepworth & Grandage Limited, Bradford, England

Filed May 21, 1979, Ser. No. 40,862
Claims priority, application United Kingdom, May 26, 1978, 23438/78
Int. Cl.[3] B32B 15/04, 15/14, 15/20; B22D 19/02
U.S. Cl. 428—472 14 Claims

9. A composite material comprising aluminium or an aluminium alloy reinforced with a fibre or whisker form of unmodified alumina which has been produced by a process which comprises (a) introducing into a mould containing a mat of unmodified alumina in fibre or whisker form, said mould and said mat having been preheated to a temperature in the range of 700° C. to 1050° C., a molten mass of aluminium or of an alloy of aluminium free from any element which reacts with said alumina in said temperature range in an amount sufficient to cover said mat with molten metal after application of pressure thereto, said aluminium or alloy being at a temperature below that at which said fibres or whiskers are attacked

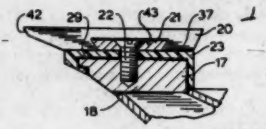
thereby (b) directly applying to the contents of said mould sufficient mechanically applied pressure to overcome the surface tension existing between said unmodified alumina and said molten mass and thereby ensuring that said molten mass fully penetrates the interstices of said alumina mat, said applied pressure being at least 75 kg/cm^2, and (c) allowing said molten aluminium or alloy thereof to solidify in contact with said unmodified alumina mat.

4,232,092

METHOD OF AND MEANS FOR PRECISION MOUNTING OF MEMBERS ON ELONGATE METALLIC SUPPORTING STRUCTURE

Denis A. Goddard, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Filed Nov. 24, 1978, Ser. No. 963,447
Int. Cl.^{2} D12G *9/00*
U.S. Cl. 428—542 **18 Claims**



10. An elongate metallic supporting structure having means for precision mounting of members thereon, comprising:

said metallic supporting structure being formed to avoid excessive warpage and having a facing area along substantially the full length of said supporting structure prepared for receiving nonmetallic mounting base means;

easily machinable nonmetallic mounting base means applied to and extending in the form of a continuous strip covering said area, said mounting base means comprising a material which is substantially free from tendency to warp during machining;

means securing said mounting base means fixedly onto said area;

and said mounting base means having an exposed receiving surface substantially accurately machined after securing of said mounting base means onto said area, for facilitating receiving and mounting of said members on said surface in predetermined substantially accurate attitude unaffected by irregularities that may be present in said area, and which irregularities might otherwise make it difficult to attain said substantially accurate attitude of said members in the absence of said machined nonmetallic base means.

4,232,093

HIGH TEMPERATURE SKIN CONSTRUCTION

Robert C. Miller, Encino, Calif., assignor to Summa Corporation, Culver City, Calif.

Filed Oct. 29, 1973, Ser. No. 410,691
Int. Cl.^{3} B21C *37/00*
U.S. Cl. 428—591 **60 Claims**

1. A metallic skin construction suitable for usage as a high temperature airfoil surface comprising:

a screen having a first set of wires and a second set of wires with the second set of wires being positioned generally transverse to the direction of the first set of wires;

the wires in said first set of wires having a generally undulating form which defines first corrugations;

the wires in said second set of wires having a generally undulating form which defines second corrugations;

the wires of said first set of wires being movable with respect to the wires of said second set of wires such that said first and second corrugations are free to expand and contract in a relatively independent manner with respect to each other;

a metallic foil having an imperforate surface;

means joining the foil to the screen at discretely spaced points, and

the foil being sufficiently thin to deform without rupturing during relative movement of the foil and screen at intermediate locations between the discretely spaced points,

whereby thermal stresses on said skin construction are absorbed by deformation of said first and second corrugations in which the first and second corrugations act in a relatively independent manner as expansion joints in providing for controlled expansion of the skin construction without rupturing of said imperforate metallic skin surface.

7. A metallic skin construction suitable for usage as a high temperature airfoil surface comprising:

means providing an imperforate metallic skin surface in said skin construction;

means providing first corrugations and second corrugations in said skin construction with said first and second corrugations being free to expand and contract in a relatively independent manner with respect to each other;

said first corrugations having a size and spacing which permits resilient expansion of said skin construction in the direction along the plane of said metallic skin surface and in a direction transverse to the direction of said first corrugations;

said second corrugations positioned in a direction substantially transverse to said first corrugations;

said second corrugations having a size and spacing which permits resilient thermal expansion of said skin construction in a direction along the plane of said metallic skin surface and in a direction transverse to the direction of said second corrugations,

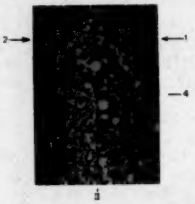
whereby thermal stresses imposed on said skin construction are absorbed by deformation of said first and second corrugations which first and second corrugations act in a relatively independent manner as expansion joints in providing for controlled expansion of the skin construction without rupture of said imperforate metallic skin surface.

4,232,094

SPRAYED COATINGS ON METAL SURFACES

Cyril E. Rhodes, Zeist, and Martin B. Verburgh, Amersfoort, both of Netherlands, assignors to SKF Industrial Trading and Development Company B.V., Nieuwegein, Netherlands

Filed Dec. 10, 1973, Ser. No. 423,646
Claims priority, application Netherlands, Dec. 12, 1972, 7216832
Int. Cl.^{2} B21F *27/02*; B05D *3/06*
U.S. Cl. 428—614 **10 Claims**



1. A method of producing an improved layer bonding in a bearing tool component subjected to relatively high stresses and comprising a sprayed exterior coating layer on a base member, said method comprising the steps of: spraying said exterior coating layer on said base member; and applying heat directly only to said exterior coating layer in an amount sufficient for remelting only said layer, in a chamber evacuated to a pressure of 10^{-1} torr or less, so that the properties of said base member remain substantially unaltered and the bonding improved.

8. A rolling bearing ring produced by the method defined in claim 1.

4,232,095

FILLER METAL IN A WELDED ASSEMBLY

Miroslav Pirner, Neuhausen am Rheinfall; Heinrich Zoller, Aesch, and Heinz Bichsel, Neuhausen am Rheinfall, all of Switzerland, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Continuation of Ser. No. 914,531, Jun. 12, 1978, abandoned.
This application Mar. 2, 1979, Ser. No. 16,927
Claims priority, application Switzerland, Jun. 29, 1977, 7983/77
Int. Cl.³ B32B *15/20*
U.S. Cl. 428—654 10 Claims

1. A filler metal in a welded assembly with aluminum alloys, said filler metal consisting essentially of: zinc from 1.0 to 4.0%; magnesium from 2.0 to 5.0%; copper from 0.2 to 0.5%; manganese from 0.3 to 0.5%; titanium from 0.05 to 0.2%; chromium from 0.05 to 0.3%; zirconium from 0.05 to 0.2%; balance aluminum, said filler metal producing welded aluminum assemblies wherein the weld has the same strength as the parent metal plus has resistance to weld boundary corrosion, weld cracking and stress corrosion without a corresponding increase in susceptibility to exfoliation corrosion in the heat affected zone.

4,232,096

COMPOSITE STEEL MATERIAL AND COMPOSITE STEEL TOOL MADE FROM THIS MATERIAL

Olof K. Franzen, Hedemora, Sweden; Ulf Hallström, L'Etang la ville, France, and Bengt A. Petersson, Söderfors, Sweden, assignors to Uddeholms Aktiebolag, Hagfors, Sweden

Continuation of Ser. No. 860,048, Dec. 13, 1977, abandoned.
This application Jan. 23, 1979, Ser. No. 5,908
Claims priority, application Sweden, Dec. 17, 1976, 7614267
Int. Cl.² C22C *38/06;* B32B *15/18*
U.S. Cl. 428—683 3 Claims

1. Composite steel material consisting of two metallically joined steel components having different chemical compositions, characterized in that a first component is a high speed tool steel or other high alloy tool steel having a carbon activity and a hardness and wear resistance in the same order as that of high speed tool steel, and that a second component is a steel essentially consisting of

0.40–0.45 weight-% carbon
0.40–1.00 weight-% silicon
0.40–1.00 weight-% manganese
2.5–4.0 weight-%chromium
0.50–1.50 weight-% molybdenum
0.20–0.45 weight-% vanadium
balance iron and normal impurities

4,232,097

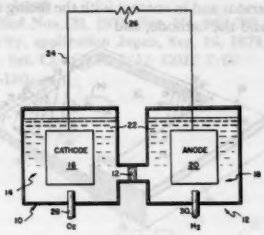
FUEL CELL OXYGEN ELECTRODE

Howard R. Shanks; Albert J. Bevolo; Gordon C. Danielson, all of Ames, Iowa, and Michael F. Weber, Wichita, Kans., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 7, 1979, Ser. No. 18,211
Int. Cl.³ H01M *4/92*
U.S. Cl. 429—44 8 Claims

1. A cathode for use in a hydrogen-oxygen fuel cell comprising:

a substrate of electrically conductive tungsten bronze crystal of the formula A_xWO_3 where A is an alkali metal selected from the group consisting of sodium, potassium, lithium, rubidium and cesium and x is at least 0.2 and a catalytic



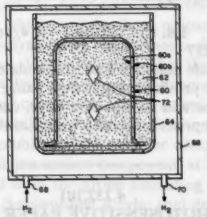
layer on the substrate wherein the alkali metal ions of the substrate have been replaced by platinum ions to form a platinum tungsten bronze of the formula Pt_yWO_3 where y is at least 0.5.

4,232,098

SODIUM-SULFUR CELL COMPONENT PROTECTED BY A HIGH CHROMIUM ALLOY AND METHOD FOR FORMING

Dong-Sil Park, Schenectady; Debajyoti Chatterji, Latham, and Manfred W. Breiter, Schenectady, all of N.Y., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Mar. 22, 1978, Ser. No. 889,046
Int. Cl.³ H01M *10/39;* B32B *15/18;* B05D *7/22*
U.S. Cl. 429—104 15 Claims



1. An electrically conductive, corrosion resistant component for a sodium-sulfur cell comprising a ferrocarbon substrate and a non-porous chromium-iron-carbon duplex alloy surface layer chemically diffusion-bonded to the substrate, said duplex alloy surface layer comprising contiguous outer and inner layers, said outer layer containing in excess of about 60 weight % chromium, and said inner layer containing less than about 50 weight % chromium in direct contact with the substrate.

4,232,099

NOVEL BATTERY ASSEMBLY

Charles I. Sullivan, Melrose, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

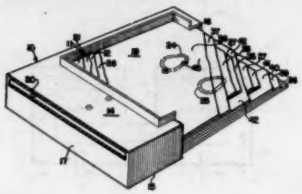
Continuation of Ser. No. 442,376, Feb. 14, 1974, abandoned.
This application Feb. 6, 1976, Ser. No. 656,063
Int. Cl.² H01M *6/46*
U.S. Cl. 429—152 2 Claims

1. A planar battery which comprises, in combination and in superposed relationship, electrical energy generating components including:

(a) a planar anode;
(b) a planar cathode superposed substantially coextensive the anode;
(c) a planar separator positioned intermediate and extending

substantially coextensive the facing surfaces of the anode and the cathode including electrolyte free marginal portions and an aqueous electrolyte permeable central portion;

(d) an aqueous electrolyte disposed in the central portion of the separator and in contact with the facing surfaces of the anode and the cathode; and



(e) an electrically nonconducting polyacrylate sealant comprising more than fifty percent by weight acrylate, said sealant being a butyl acrylate/diacetone acrylamide/-styrene/methacrylic acid (60/30/4/6), said sealant being located only peripherally of said centrally disposed aqueous electrolyte located on electrolyte free marginal surfaces of the separator, permeating said separator, and securing said separator to contiguous facing surfaces of said anode or said cathode.

4,232,100

ELECTRODE PLATE FOR LEAD ACCUMULATORS

Ulf S. G. Magnusson, and Lars E. Uhrbom, both of Hultsfred, Sweden, assignors to Nordiska Ackumulatorfabriker Noack AB, Stockholm, Sweden

Filed Apr. 17, 1978, Ser. No. 897,214

Claims priority, application Fed. Rep. of Germany, May 27, 1977, 2723946

Int. Cl.³ H01M *4/14, 4/16*

U.S. Cl. 429—217 **6 Claims**

1. An electrode plate for lead accumulators, the surfaces of which plate are provided with a dust-fixing coating of a copolymer of styrene and acrylic acid ester, characterized in that the coating comprises a film of a water-insoluble plastics material.

4,232,101

PHOTOSENSITIVE PAPER FOR ELECTROPHOTOGRAPHY WITH AN ELECTRICALLY CONDUCTIVE COATING OF A FLUORINE RESIN

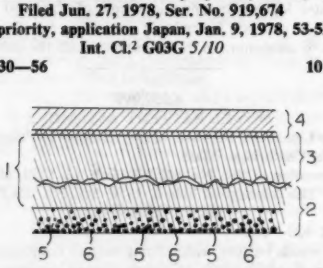
Hideo Fukuda, Katano; Hiroichi Morikawa, Osaka; Yasutoki Kamezawa, Kyoto, and Tatsuo Aizawa, Osaka, all of Japan, assignors to Mita Industrial Company Ltd., Osaka, Japan

Filed Jun. 27, 1978, Ser. No. 919,674

Claims priority, application Japan, Jan. 9, 1978, 53-528

Int. Cl.² G03G *5/10*

U.S. Cl. 430—56 **10 Claims**



1. A photosensitive paper for electrophotography which comprises a paper substrate, an electrophotographic photosensitive layer formed on one surface of the paper substrate and an electrically conductive coating layer formed on the other surface of the paper substrate, said electrically conductive coating layer comprising an electrically conductive binder medium and from 0.1 to 20% by weight based on the entire binder medium of a fine powder of a fluorine resin having a particle size of 0.5 to 10μ distributed predominantly in the surface portion of said electrically conductive coating layer.

4,232,102

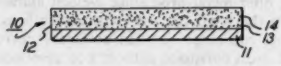
IMAGING SYSTEM

Anthony M. Horgan, Pittsford, and Richard W. Radler, Jr., Marion, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 833,130, Sep. 14, 1977, abandoned. This application May 18, 1979, Ser. No. 40,332

Int. Cl.³ G03G *5/087, 5/14*

U.S. Cl. 430—58 **16 Claims**



1. An imaging member comprising a layer of particulate photoconductive material dispersed in an organic resinous binder, said photoconductive material comprising trigonal selenium containing a mixture of alkali metal selenite and alkali metal carbonate of from about 0.01 to about 12.0 percent total weight based on the weight of the trigonal selenium wherein ratio of the selenite to carbonate ranges from 90 to 10 parts by weight to 10 to 90 parts by weight.

4,232,103

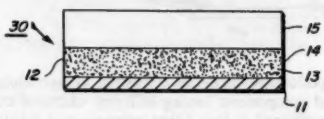
PHENYL BENZOTRIAZOLE STABILIZED PHOTOSENSITIVE DEVICE

William W. Limburg, Penfield, and Damodar M. Pai, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

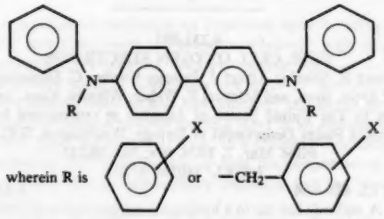
Filed Aug. 27, 1979, Ser. No. 69,649

Int. Cl.³ G03G *5/04, 5/14*

U.S. Cl. 430—59 **5 Claims**



1. In an imaging member comprising a hole generation layer and a contiguous hole transport layer, said generation layer comprising a photoconductive material exhibiting the capability of photogeneration of holes and injection of said holes, said hole transport layer comprising a transparent electrically inactive polycarbonate resinous material having dispersed therein from about 25 to about 75% by weight of the composition of one or more of the following diamines:



and wherein X is independently selected from the group con-

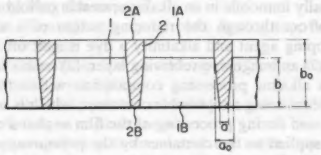
sisting of an alkyl group having from 1 to about 4 carbon atoms and chlorine in the ortho, meta or para position, said transport layer also containing a chlorine-containing organic solvent in an amount less than about 3% by weight of the transport layer, the improvement consisting of stabilizing said transport layer against the deleterious effects of ultraviolet light by the presence in said transport layer of a stabilizing proportion of a substituted or unsubstituted 2-(2'-hydroxyphenyl)-benzotriazole.

4,232,104

SUBSTRATES FOR USE IN SCREEN PHOTOSENSITIVE ELEMENT

Sohji Shinozaki, and Yoshiaki Takei, both of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed May 9, 1978, Ser. No. 905,036
Claims priority, application Japan, May 11, 1977, 52-53220
Int. Cl.² G03G 5/04
U.S. Cl. 430—68 **2 Claims**



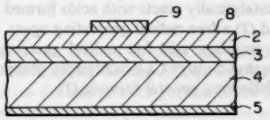
1. In a conductive substrate for use in a screen photosensitive element, which substrate is provided all over its surface with a plurality of micro-openings, said substrate having an insulating layer formed on the surface of one side thereof including an internal circumferential surface of each of said micro-openings and having a conductive layer formed at least on said insulating layer positioned at said surface of one side of said substrate and further a photoconductive photosensitive layer formed on the surface of the other side of said substrate opposite to said one side of said substrate having formed thereon said insulating and conductive layers, the improvement comprising a structure of the substrate, characterized in that each of said micro-openings is formed, the internal circumferential surface of which is inclined over substantially the whole of the direction of the thickness of said substrate so that a wire surface width of said substrate at the side of said insulating layer, which wire surface width corresponds to one circumferential edge of each of said micro-openings, is smaller than that at the side of said photoconductive photosensitive layer, whereby at the time of spraying said substrate from the side of said smaller wire surface width with an insulating material capable of forming said insulating layer the insulating material is allowed to readily adhere to said surface of one side of said substrate and said internal circumferential surface of each of said micro-openings without lowering the percent of opening and further the ratio of the smaller wire surface width to the larger wire surface width and the ratio of the depth of the inclined portion of each micro-opening to the thickness of said substrate are respectively within the range of from 1/5 to 4/5.

4,232,105

PHOTOSENSITIVE LITHOGRAPHIC PRINTING PLATE WITH HYDROPHILIC SUBLAYER

Hideaki Shinohara, Houya; Masaru Kato, and Yoshiaki Takamatsu, both of Tokyo, all of Japan, assignors to Oji Paper Co., Ltd., Tokyo, Japan

Filed Nov. 21, 1978, Ser. No. 962,700
Claims priority, application Japan, Sep. 14, 1978, 53-112335
Int. Cl.² G03C 1/52; G03F 7/02
U.S. Cl. 430—160 **11 Claims**



1. A photosensitive lithographic printing plate comprising:
a supporting layer comprising a substrate and having a hydrophilic surface, and;
a photosensitive layer which is formed on said hydrophilic surface of said supporting layer and which comprises a mixture of:
(A) a photosensitive diazo resin modified with a phenol compound, which resin has been prepared by pre-condensation polymerizing an aromatic diazonium compound and an aldehyde compound in the presence of an acid catalyst, by blending salt pre-condensation product with a phenol compound, and by completely condensation polymerizing said blend, and;
(B) a water-soluble acrylic polymer compound containing, as a polymarization component, at least one member selected from the group consisting of acrylic acid and α- and β-substituted acrylic acid derivatives,
which printing plate is characterized in that said hydrophilic surface is formed by a surface of a hydrophilic layer located between said substrate and said photosensitive layer, said hydrophilic layer comprising (I) a resinous component consisting of (a) from 5 to 40% by weight of at least one urea compound resin selected from the group consisting of non-modified urea-formaldehyde resins, cation-modified urea-formaldehyde resins modified with 5 to 20% based on the weight of the urea, of at least one multifunctional basic compound having two or more basic groups, nonion-modified urea-formaldehyde resins modified with 5 to 15%, based on the weight of the urea, of at least one polyol compound and anion-modified urea-formaldehyde resins modified with 5 to 15%, based on the weight of the urea, of at least one acid salt of sulfurous acid, and (b) from 60 to 95% by weight of at least one polyamide resin selected from the group consisting of nylon 6, nylon 66, nylon 610, modified polyamide resins which have been prepared by modifying at least one member selected from the group consisting of nylon 6, nylon 66 and nylon 610, with a modifying agent consisting of a member selected from the group consisting of mixtures of formaldehyde and aliphatic alcohols and epoxy compounds, and mixtures of epichlorohydrin and polyamine compounds, and (II) a pigment component mixed into said resinous component.

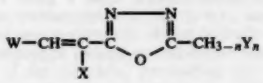
4,232,106

PHOTOSENSITIVE COMPOSITIONS CONTAINING 2-HALOMETHYL-5-VINYL-1,3,4-OXADIAZOLES AS FREE RADICAL PROGENITORS

Masayuki Iwasaki; Shigeru Sato, both of Minami-ashigara; Yasuo Inoue, and Akira Nagashima, both of Shizuoka, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Nov. 16, 1978, Ser. No. 961,164
Claims priority, application Japan, Nov. 28, 1977, 52/142473
Int. Cl.[2] G03C 1/68, 1/52
U.S. Cl. 430—170 13 Claims

1. In a photosensitive composition containing (1) a phosensitive compound selected from the group consisting of a photosensitive diazo compound, a photosensitive azide compound, an ethylenically unsaturated compound, and a compound which catalytically reacts with acids formed upon exposure to light and (2) a free radical generating agent, the improvement which comprises, said free radical generating agent being a 2-halomethyl-5-vinyl-1,3,4-oxadiazole compound represented by the following general formula (I):



(I)

wherein W represents a substituted or unsubstituted aryl group, X represents a hydrogen atom, an alkyl group or an aryl group, Y represents a fluorine atom, a chlorine atom or a bromine atom, and n represents an integer of 1 to 3.

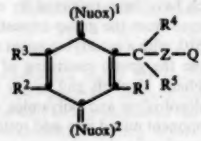
4,232,107

PHOTOGRAPHIC MATERIAL SUITED FOR USE IN DIFFUSION TRANSFER PHOTOGRAPHY AND METHOD OF DIFFUSION TRANSFER PHOTOGRAPHY USING SUCH MATERIAL

Wilhelmus Janssens, Aarschot, Belgium, assignor to AGFA-GEVAERT N.V., Mortsel, Belgium

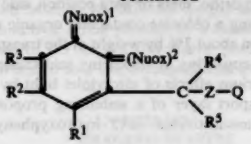
Filed Mar. 15, 1979, Ser. No. 20,651
Claims priority, application United Kingdom, Mar. 22, 1978, 11445/78
Int. Cl.[3] G03C 1/40, 5/54, 1/10, 1/48
U.S. Cl. 430—223 12 Claims

1. A photographic silver halide material comprising a support carrying at least one unexposed alkali-permeable silver halide hydrophilic colloid emulsion layer which contains in operative contact therewith or therein a quinone-type compound that is immobile in an alkali-permeable colloid medium and that contains a photographically useful group and a ballast group, wherein said compound is capable of being reduced by a silver halide developing agent at a rate slower than that of imagewise developable silver halide in the photographic material and in reduced state is capable of releasing said photographically useful group under alkaline conditions, characterized in that said quinone-type compound corresponds to one of the following formulae (A) or (B):



(A)

-continued



(B)

wherein:

each of $(Nuox)^1$ and $(Nuox)^2$ (same or different) represents an oxidized nucleophilic group,

Z represents a bivalent atomic group which is electronegative with respect to the carbon atom carrying R^4 and R^5,

Q together with the Z group represents a releasable photographically useful group,

each of R^1, R^2 and R^3 is hydrogen, halogen, alkyl, alkoxy, or an acylamino group or R^1 and R^2 when in adjacent positions on the ring together form a ring fused with the remainder of the molecule, or R^2 and R^3 together form a ring fused with the remainder of the molecule,

each of R^4 and R^5 (same or different) represents hydrogen or a hydrocarbon group, and in at least one of the substituents R^1, R^2, R^3, R^4 or R^5 a ballasting group X of sufficient size is present to render said compound immobile in an alkali-permeable layer of the photographic material.

9. A photographic material according to claim 1, characterized in that the material is a film unit that is adapted to be processed by passing said unit between a pair of juxtaposed pressure-applying members, said unit comprising (1) a photosensitive element, which contains a silver halide emulsion layer having associated therewith said quinone type compound that is initially immobile in an alkali-permeable colloid medium and wherefrom through the reducing action of a silver halide developing agent and alkalinity a dye is split off in diffusible state, (2) an image dye-receiving layer, (3) means for discharging an alkaline processing composition within the film unit, said means being a rupturable container, which is adapted to be positioned during processing of the film so that a compressive force applied to the container by the pressureapplying members will effect a discharge of the container's contents within the film, and (4) a silver halide developing agent, which is soluble in an alkaline processing composition located within said film unit.

4,232,108

MARKING TRANSFER SHEETS

Rolf Dessauer, Greenville, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 884,500, Mar. 8, 1978, which is a continuation-in-part of Ser. No. 617,540, Sep. 29, 1975, abandoned, which is a continuation-in-part of Ser. No. 516,483, Oct. 21, 1974, abandoned. This application May 1, 1979, Ser. No. 35,106
The portion of the term of this patent subsequent to Jun. 14, 1996, has been disclaimed.
Int. Cl.[2] G03C 1/90, 1/52, 5/24, 5/04
U.S. Cl. 430—259 9 Claims

1. A marking transfer sheet comprising an imaging layer on a carrier support, the imaging layer comprising

(a) a radiation-sensitive composition which, upon exposure to radiation, is capable of forming a colored substance that can absorb at least a portion of the wavelength of light in the visible spectrum, the radiation-sensitive composition being present in an amount sufficient to produce, upon exposure to radiation, a detectable difference in diffuse reflectance density between exposed and unexposed areas,

(b) pigment capable of diffusely reflecting the wavelengths of light absorbed by the colored substance, the pigment being present in a density of about from 0.05 to 0.34 gram per square foot, and

(c) radiation-transmissive, colorless, polymeric, film-forming, thermoplastic binder.

4,232,109

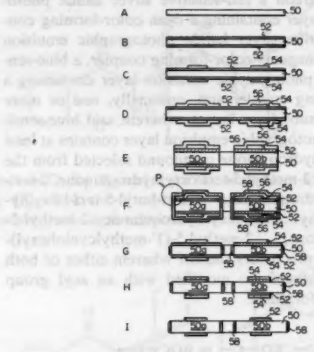
METHOD FOR MANUFACTURING SUBMINIATURE QUARTZ CRYSTAL VIBRATOR

Shigeru Kizaki, Hanno, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Division of Ser. No. 925,936, Jul. 19, 1978. This application Feb. 14, 1979, Ser. No. 12,126

Int. Cl.³ H01L *41/08;* H03H *9/14*

U.S. Cl. 430—312 **6 Claims**



1. A method of manufacturing a flexural mode quartz crystal vibrator, comprising the steps of:

grinding an X-cut quartz crystal plate having top, bottom and side surfaces;

forming a first metallic film on said top and bottom surfaces of said quartz crystal plate;

forming an electrode pattern on said first metallic film by means of a negative photo resist;

forming a tuning fork pattern on said top and bottom surfaces of said quartz crystal plate by means of a positive photo resist;

etching said first metallic film and said quartz crystal plate masked by said tuning fork pattern to form a tuning fork shape having first and second tines;

forming a second metallic film being different in material from said first metallic film on said first and second tines so as to cover said positive resist and the sides of each tine;

removing said positive photo resist formed on said first metallic film and said second metallic film formed on said positive photo resist to form side electrodes on the sides of said each tine;

etching said first metallic film masked by said negative photo resist to form said electrode pattern; and

removing said negative photo resist from said first metallic film to form planar electrodes on the top and bottom surfaces of said each tine.

4,232,110

SOLID STATE DEVICES FORMED BY DIFFERENTIAL PLASMA ETCHING OF RESISTS

Gary N. Taylor, Fanwood, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 12, 1979, Ser. No. 19,711

Int. Cl.² H05K *3/00;* G03C *5/00*

U.S. Cl. 430—313 **34 Claims**

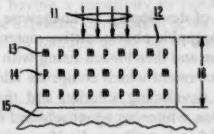
1. A method of producing a solid state device including at least one pattern delineation step by steps comprising:

(a) selectively irradiating a resist film on a substrate with actinic radiation;

(b) treating said film to fix the pattern; and

(c) exposing said film to a plasma to produce a negative resist pattern;

the invention characterized in that said film comprises a polymer and at least one type of monomer, and characterized further in that the step of selectively irradiating the film locks the monomer or monomers in the portions of the film that are selectively irradiated, the step of treating



the film reduces the amount of unlocked monomer or monomers in the film, and the step of exposing the film to a plasma removes the unirradiated portion of the film at a faster rate than the irradiated portion due to the presence of the locked monomer or monomers in the irradiated portion of the film, so that the differential etch ratio is at least 1.05.

4,232,111

PHOTOGRAPHIC PHOTOSENSITIVE ELEMENT WITH PROTECTIVE LAYER AND IMAGE FORMING METHOD USING SAME

Takushi Miyazako, and Shigeru Nagatomo, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation of Ser. No. 686,984, May 17, 1976, abandoned, which is a continuation of Ser. No. 506,812, Sep. 17, 1974, abandoned. This application Oct. 11, 1977, Ser. No. 840,950

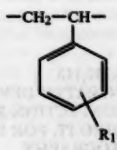
Claims priority, application Japan, Sep. 17, 1973, 48-104761

Int. Cl.² G03C *5/24, 1/78, 1/96*

U.S. Cl. 430—355 **11 Claims**

1. A photographic photosensitive element containing at least one silver halide emulsion layer and as the uppermost layer thereof a protective layer containing about 10 to about 70% by weight of a copolymer consisting of

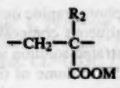
(a) 30 to 70 mole % of the recurring unit represented by the formula (I)



(I)

wherein R_1 is a hydrogen atom or a methyl group; and

(b) 70 to 30 mole % of the recurring unit represented by the formula (II)



(II)

wherein R_2 is a hydrogen atom or a methyl group and M is selected from the group consisting of hydrogen, lithium, sodium, potassium and NH_4.

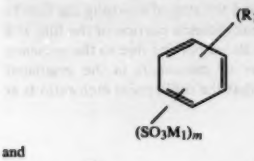
4,232,112

PROCESS FOR TREATING SILVER HALIDE COLOR PHOTOGRAPHIC PHOTOSENSITIVE MATERIAL

Satoru Kuse, Hino, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

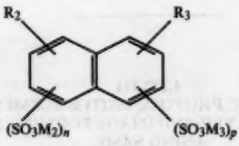
Filed Feb. 5, 1979, Ser. No. 9,583
Claims priority, application Japan, Feb. 10, 1978, 53-14280
Int. Cl.[2] G03C 5/32, 7/16
U.S. Cl. 430—393 5 Claims

1. In a process of developing an imagewise exposed silver halide color photographic photosensitive material with a color developing solution and then bleach-fixing with a bleach-fixing solution, the improvement which comprises adding, to at least one of the color developing solution and the bleach-fixing solution, at least one whitening agent selected from the group consisting of 4,4'-diaminostilbene-disulfonic acid derivatives and at least one additive selected from compounds of the following formulae (I) and (II):



(I)

and



(II)

wherein R_1, R_2 and R_3 are individually hydrogen, an alkyl group or an alkenyl group, M_1, M_2 and M_3 are individually hydrogen or a cation, l and m are individually an integer of 1 to 3 inclusive, and n and p are individually an integer to satisfy an inequality of $1 \leqq n+p \leqq 8$.

4,232,113

LIQUID CONCENTRATED DEVELOPER COMPOSITION, AND CONFECTION READY TO MIX WITH WATER INCLUDING IT, FOR USE IN COLOR PHOTOGRAPHY

Carlo Marchesano, Savona, Italy, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 14, 1979, Ser. No. 20,313
Int. Cl.[2] G03C 5/30
U.S. Cl. 430—450 21 Claims

1. A concentrated color photographic developer solution to be mixed with an alkaline aqueous composition characterized by the fact that said concentrated solution is a liquid composition having no more than 5% volume of the total volume of said concentrated composition as water and includes 5 to 50 g per 100 ml of said solution of a p-phenylene-diamine compound dissolved in a photographically neutral organic solvent which is miscible with water.

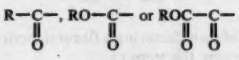
4,232,114

COLOR PHOTOGRAPHIC LIGHT-SENSITIVE ELEMENTS CONTAINING ANTI-COLOR FOGGING AGENTS

Keiichi Adachi; Tadao Shishido, and Akio Mitsui, all of Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Ashigara, Japan

Continuation-in-part of Ser. No. 800,817, May 26, 1977, abandoned. This application Sep. 1, 1978, Ser. No. 939,108
Claims priority, application Japan, May 31, 1976, 51-63099
Int. Cl.[2] G03C 1/76
U.S. Cl. 430—504 11 Claims

1. A color photographic light-sensitive element comprising a support having thereon a red-sensitive silver halide photographic emulsion layer containing a cyan color-forming coupler, a green-sensitive silver halide photographic emulsion layer containing a magenta color-forming coupler, a blue-sensitive silver halide photographic emulsion layer containing a yellow color-forming coupler and, optionally, one or more non-light-sensitive subsidiary layers, wherein said blue-sensitive silver halide photographic emulsion layer contains at least one asymmetrical hydroquinone compound selected from the group consisting of 2-methyl-5-tert-octylhydroquinone, 2-tert-butyl-5-tert-amylhydroquinone, 2-tert-butyl-5-tert-hexylhydroquinone, 2-methyl-5-tert-hexylhydroquinone, 2-methyl-5-tert-amylhydroquinone, 2-methyl-5-(1'-methylcyclohexyl)-hydroquinone, and precursors thereof wherein either or both hydroxyl groups thereof are modified with an acyl group represented by the formulae:



wherein R represents an alkyl group, said at least one asymmetrical hydroquinone compound serving to reduce color fogging without reducing the sensitivity and light fastness of a yellow dye image formed in said blue-sensitive silver halide photographic emulsion layer.

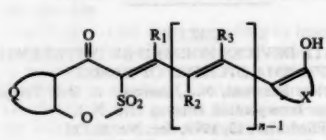
4,232,115

BLEACHABLE PHOTOGRAPHIC SENSITIZING DYES

Ross A. Lee, Webster, N.Y., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 890,788, Mar. 27, 1978, abandoned. This application Feb. 22, 1979, Ser. No. 15,005
Int. Cl.[3] C07D 327/06, 411/06, 405/14
U.S. Cl. 430—522 10 Claims

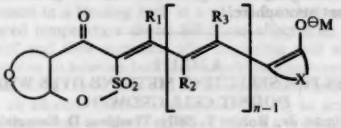
1. As a new composition of matter, a sensitizing or filter dye having one of the following general formulas:



(A)

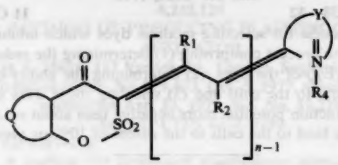
wherein Q represents sufficient carbon atoms to complete a benzo or naphto nucleus, or a substituted benzene or napthalene nucleus, R_1, R_2 and R_3 each represent H or a C_1–C_3 alkyl group, n=1, 2 or 3, and X represents sufficient nonmetallic atoms to complete a 5- or 6-membered heterocyclic or carbocyclic nucleus;

(B)



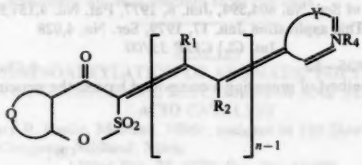
wherein Q, R_1, R_2, R_3 and n are the same as in formula A, and M is a mono-, di-, or trivalent metal;

(C)



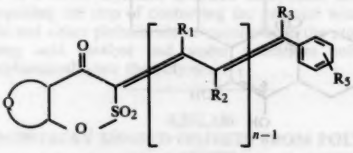
wherein Q, R_1, R_2 and n are the same as in formula A, R_4 is a C_1–C_{12} alkyl, and Y represents sufficient nonmetallic atom to complete a 5- or 6-membered heterocyclic nucleus;

(D)



wherein Q, R_1, R_2, n, R_4, and Y are the same as in formula C; and

(E)



wherein Q, R_1, R_2, R_3 and n are the same as in formula A and R_5 can be H, a C_1–C_{12} alkyl group, an NO_2 group, an alkyloxy or alkylthio group wherein the alkyl group contains 1–6 carbon atoms, or a dialkylamino group wherein each alkyl group contains 1–6 carbon atoms.

4,232,116

LIGHT-HANDLEABLE PHOTOGRAPHIC MATERIALS

Peter B. Jamieson, Harlow, England, assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation of Ser. No. 719,289, Aug. 31, 1976, Pat. No. 4,140,531. This application Jan. 31, 1979, Ser. No. 7,949

Int. Cl.³ G03C *1/84*

U.S. Cl. 430—510 **14 Claims**

1. Ultraviolet radiation sensitive photographic film material comprising:

1. a base,
2. at least one layer adjacent to said base comprising a photographic silver halide emulsion, and
3. a yellow filter dye layer adjacent to and over said at least one emulsion layer,

the silver halide in said silver halide emulsion comprising at least 50 mole % silver chloride and the remainder comprising silver bromide and silver iodide whereby the emulsion has a high natural sensitivity to ultra violet radiation and a low visible light sensitivity,

said yellow filter dye layer having an optical density of no more than 0.3 between 250 and 380 nm, an optical density which increases from 380 to 420 nm to at least 1.0, and an optical density above 400 nm which proportionately does not decrease any faster with increasing wavelengths than does the log. sensitivity of said silver halide emulsion, and

said film material having a sensitivity to radiation such that upon image-wise exposure to radiation of 460 to 520 nm and development for 2¼ minutes at 20° C. in a developer comprising:

methyl-p-aminophenol sulfate	2.2 g
hydroquinone	8.8 g
sodium carbonate	48.0 g
sodium sulfite	72.0 g
potassium bromide	4.0 g
hexametaphosphate	2.2 g
distilled water to	1000 ml

followed by conventional rinsing, fixing, and drying, gives an optical density of no more than 0.1 above chemical fog plus base, where said image-wise exposure is to 0.2 erg/mm² of an equienergy spectrum light restricted to a wavelength band of 460 to 520 nm.

4,232,117

PHOTOGRAPHIC LIGHT-SENSITIVE MATERIALS HAVING IMPROVED FILM PHYSICAL PROPERTIES

Takashi Naoi, and Ikutard Horie, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Feb. 13, 1978, Ser. No. 877,524

Claims priority, application Japan, Feb. 14, 1977, 52-14817

Int. Cl.² G02C *1/78*

U.S. Cl. 430—539 **17 Claims**

1. A silver halide photographic light-sensitive element exhibiting good transparency after development comprising at least one silver halide emulsion layer on a support and two or more hydrophilic colloid layers on at least one side of said support, wherein (i) a hydrophilic colloid layer positioned farther from the support contains gelatin, a matting agent having an average particle size of 1 to 5μ and colloidal silica having an average particle size less than that of the matting agent and (ii) a hydrophilic colloid layer which is positioned nearer the support than the position of hydrophilic colloid layer (i) consists essentially of gelatin and a polymer latex comprising an aqueous dispersion of a water-insoluble polymer wherein the polymer has an average particle size of about 20 mμ to about 200 mμ, said matting agent being present in an amount effective to decrease the adhesion of the hydrophilic colloid layer in which it is present, said collidal silica being present in an amount effective to improve the antiadhesive property of the hydrophilic layer in which it is present and said polymer latex being present in an amount effective to improve dimensional stability, gelatin present in the element layers serving as a hydrophilic binder.

4,232,118

LIGHT-SENSITIVE SILVER HALIDE PHOTOGRAPHIC MATERIAL

Ken Okauchi; Takeo Koitabashi, and Noboru Fujimori, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

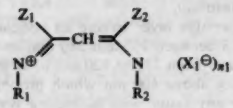
Filed Mar. 1, 1979, Ser. No. 16,546

Claims priority, application Japan, Mar. 10, 1978, 53/26528

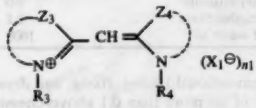
Int. Cl.³ G03C *1/14*

U.S. Cl. 430—574 **7 Claims**

1. A photographic material having a light sensitive silver halide emulsion layer coated on a support which contains a compound of the following general formula I and a compound of the following general formula II:



wherein Z_1 represents a group of non-metal atoms required to complete a 5 membered heterocyclic residue containing an oxygen atom; Z_2 represents a group of non-metal atoms required to complete a 5 membered heterocyclic residue containing an oxygen, sulfur or selenium atom; R_1 and R_2 each represent aliphatic groups, at least one of them containing a sulfo or carboxyl group; $X_1^{\ominus}$ represents an acid anion and n_1 represents a number of 0 or 1, said n_1 being 0 when an intramolecular salt is formed;



wherein Z_3 and Z_4 each represent groups of non-metal atom required for forming a thiazole, benzothiazole, naphthothiazole, selenazole, benzoselenazole, naphthoselenazole nucleus, R_3 and R_4 each represent aliphatic groups, at least one of them containing a sulfo or carboxyl group, $R_2^{\ominus}$ represents an anion and n_2 represents a number of 0 or 1, said n_2 being 0 when an intramolecular salt is formed.

4,232,119

REAGENT FOR USE IN IMMUNOCHEMICAL ASSAY METHODS

Jan P. E. Carlsson, Uppsala; Rolf E. A. V. Axén, Bälinge, and Håkan N. Y. Drevin, Brunna, all of Sweden, assignors to Pharmacia Diagnostics AB, Uppsala, Sweden

Filed Mar. 2, 1978, Ser. No. 882,545

Claims priority, application Sweden, Mar. 4, 1977, 7702464

Int. Cl.[2] C12Q *1/66*

U.S. Cl. 435—7 **5 Claims**

1. A reagent for use in immunochemical assay methods carried out in the presence of an aqueous liquid, wherein said reagent comprises a conjugate of one or more molecules of immunoglobulin and one or more units of an analytically indicatable group, which molecules and units are bound together via bridges containing the group —S—S—, said conjugate being soluble in said aqueous liquid.

4,232,120

INSTRUMENT AND METHOD FOR TRANSFERRING MICROBIOLOGICAL SAMPLES IN A PREDETERMINATED GASEOUS ENVIRONMENT

Eduard Engelbrecht, Park Vronesteyn 49, Voorburg, Netherlands

Filed Jan. 22, 1979, Ser. No. 5,348

Claims priority, application Switzerland, Feb. 2, 1978, 1129/78

Int. Cl.[3] C12Q *1/24*

U.S. Cl. 435—30 **9 Claims**

1. An apparatus for transferring or inoculating microbiological cultures requiring a protective gaseous environment during handling and incubation, which comprises

(a) a needle arranged to be successively introduced into different receptacles to transfer a portion of microbiological culture carried by the needle from one receptacle to another receptacle;

(b) a hollow base means on which the needle is disposed; and

(d) gas distributing means comprising a nozzle carried by the base and operable to direct a flow of gas substantially parallel to, and around, the needle to form the gaseous environment as a protective shield between the portion of the microbiological culture carried by the needle and the ambient atmosphere.

4,232,121

PROCESS FOR SELECTING METHINE DYES WHICH INHIBIT CELL GROWTH

Paul B. Gilman, Jr.; Robert T. Belly; Thaddeus D. Koszelak, and Seymour Zigman, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 25, 1978, Ser. No. 945,275

Int. Cl.[3] C12Q *1/18*

U.S. Cl. 435—32 **11 Claims**

1. A process for selecting methine dyes which inhibit cell growth, the process comprising (1) determining the reduction potential (E_R) of the dyes, (2) determining the ability of the dyes to bind to the cells and (3) selecting those dyes which have a reduction potential more negative than about −0.8 volt and which bind to the cells to the extent of 10% or greater.

4,232,122

ANTIOXIDANTS, ANTIOXIDANT COMPOSITIONS AND METHODS OF PREPARING AND USING SAME

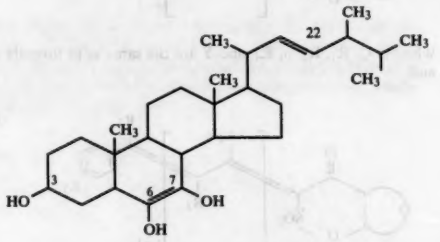
Fritz W. Zilliken, Remagen, Fed. Rep. of Germany, assignor to Z-L Limited Partnership, Janesville, Wis.

Division of Ser. No. 804,594, Jun. 8, 1977, Pat. No. 4,157,984. This application Jan. 17, 1979, Ser. No. 4,028

Int. Cl.[3] C12P *33/00*

U.S. Cl. 435—52 **6 Claims**

1. A method of preparing a compound having the structure:



comprising fermenting soybeans with the fungus Rhizopus oligosporus and/or the fungus Rhizopus oryzae, contacting the resulting soybean product with 60–70% aqueous methanol to separate from said fermented soybean product an extract containing said compound, and isolating said compound from said extract.

4,232,123

METHOD FOR MAKING WATER-SOLUBLE HYDROLYZATES OF KERATINACEOUS MATERIALS

Klaus Braeumer, Weinheim; Zdenek Eckmayer, Heidelberg; Alexander Berg, Holzminden; Rolf Monsheimer, Darmstadt-Eberstadt, and Ernst Pfleiderer, Darmstadt-Arheilgen, all of Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim and RUM/o/ hm GmbH, Darmstadt, both of, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 876,239, Feb. 9, 1978, abandoned. This application Jul. 9, 1979, Ser. No. 55,963

Claims priority, application Fed. Rep. of Germany, Feb. 11, 1977, 2705669

Int. Cl.[3] C12P *21/06, 13/12;* C14C *1/00;* C07G *7/00*

U.S. Cl. 435—69 **8 Claims**

1. A method for making a water-soluble hydrolyzate of keratinaceous starting material, wherein the keratinaceous starting material is selected from the group consisting of loose

hair, loose wool, scales, nails, claws, hooves and horns, which method comprises first subjecting said starting material to acid treatment in a treating bath at a pH of 2 or below and at an elevated temperature above 80° C. to effect mild hydrolysis thereof and then enzymatically degrading said acid-treated material in an aqueous bath at a temperature between about 30° C. and 70° C. for 4 hours to 24 hours in the presence of urea with an alkaline bacterial proteinase having an activity optimum in a range between pH 9 and pH 13, the initial pH of the enzymatic treatment being within the pH range optimum for the enzyme employed.

4,232,124

METHOD OF PRODUCING PLASMINOGEN ACTIVATOR

George F. Mann, 117 Venner Rd., London, England (SE26)

Continuation of Ser. No. 839,433, Oct. 5, 1977, abandoned. This application Apr. 23, 1979, Ser. No. 32,218

Int. Cl.³ C12N *9/72, 9/48*

U.S. Cl. 435—212 **6 Claims**

1. A method for producing plasminogen activator which comprises culturing human diploid lung cells in vitro in an aqueous nutrient maintenance medium free of serum containing therein an inducer which enhances production of plasminogen activator by the cells until plasminogen activator content in the nutrient medium exceeds 100 CTA units/ml and thereafter separating nutrient medium from the cells.

4,232,125

AMINOALKYLATION OF AROMATIC POLYMERS USING ALDEHYDE, DIACYLAMINE AND STRONG ACID CATALYST

Gary R. Buske, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Feb. 22, 1979, Ser. No. 13,956

Int. Cl.³ C08C *19/22;* C08F *8/30*

U.S. Cl. 521—32 **17 Claims**

1. A method for diacylaminoalkylating a cross-linked polymer of a monovinylidene aromatic compound, said method comprising the step of contacting the polymer with an aldehyde and either phthalimide or maleimide in the presence of a strong acid catalyst and under conditions sufficient to diacylaminoalkylate the polymer.

4,232,126

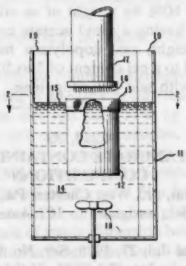
NONTACKY SHAPED OBJECTS FROM POLYMER LATICES

Mark J. Marquisee, Landenberg, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 838,365, Sep. 30, 1977, which is a continuation-in-part of Ser. No. 700,965, Jun. 29, 1976, abandoned. This application Dec. 18, 1978, Ser. No. 971,687

Int. Cl.² C08J *9/00;* B01J *13/00*

U.S. Cl. 521—65 **20 Claims**



1. A method of preparing nontacky, elastomeric shaped objects which comprises bringing shaped bodies of a normally tacky, uncured elastomer latex having a solids content of 20% to 65% by weight into contact with an aqueous bath containing, based on the total weight of the bath,

(a) 0.5 to 25% by weight of a soluble coagulating salt for the latex, and

(b) 0.01 to 5% by weight of a soluble or colloidally dispersed, hydrous, inorganic oxide selected from the group consisting of silicic acid polymers aluminic acid polymers, silicic acid-aluminic acid copolymers, and mixtures thereof,

said bath having a pH of 2 to 7 such that, when a drop of 1.0 N NaOH is added to the bath, the drop is immediately surrounded by a cloudy coating of gelled, hydrous, inorganic oxide, thereby coagulating the latex and forming highly porous shaped objects of the coagulated elastomer coated with water insoluble, hydrous, inorganic oxide.

14. A coagulating and coating bath which comprises,

(a) 0.5 to 25% by weight of a soluble coagulating salt for a normally tacky, uncured elastomer latex, and

(b) 0.01 to 5% by weight of a soluble or colloidally dispersed, hydrous, inorganic oxide selected from the group consisting of silicic acid polymers, aluminic acid polymers, silicic acid-aluminic acid copolymers, and mixtures thereof,

said bath having a pH of 2 to 7 such that, when a drop of 1.0 N NaOH is added to the bath, the drop is immediately surrounded by a cloudy coating of gelled, hydrous inorganic oxide.

4,232,127

FURAN-MODIFIED ISOCYANURATE FOAMS

Moses Cenker, Trenton, and Thirumurti L. Narayan, Riverview, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 19, 1974, Ser. No. 534,559

The portion of the term of this patent subsequent to Jul. 15, 1992, has been disclaimed.

Int. Cl.³ C08G *18/14*

U.S. Cl. 521—106 **12 Claims**

1. A composition of matter consisting essentially of:

an isocyanurate rigid foam having furan linkages bound to the backbone of the isocyanurate foam structure.

4,232,128

POROUS SHAPED CELLULOSE HYDRATE ARTICLE WITH AN IMPROVED CLEANING EFFECT

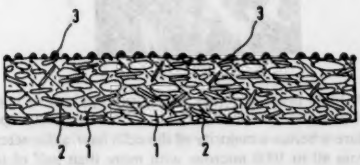
Wolfgang Michel, Wiesbaden, and Heinz Kilberer, Walluf, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Dec. 15, 1977, Ser. No. 860,903

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1976, 2656968

Int. Cl.² A47L *13/16*

U.S. Cl. 521—134 **15 Claims**



1. A porous shaped article comprising cellulose hydrate and polyolefin fibrids wherein said fibrids are present in an amount from about 10 to about 80 percent by weight of the shaped article.

4,232,129

DISPERSIBLE VINYLIDENE CHLORIDE POLYMER MICROGEL POWDERS AS ADDITIVES FOR URETHANE POLYMER FOAM

Dale S. Gibbs; Jack H. Benson, and Reet T. Fernandez, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 15, 1978, Ser. No. 942,512
Int. Cl.³ C08K 5/05, 5/13
U.S. Cl. 521—137 14 Claims

1. A composition of matter for use in the preparation of urethane polymer foam having enhanced physical properties comprising (A) a liquid organic reactant which is used in the preparation of said foam, the reactant being a nonsolvent for vinylidene chloride polymers and (B) a crosslinked vinylidene chloride polymer microgel powder which is dispersed in the nonsolvent, said powder being obtained by a method comprising the steps of

(I) preparing a microgel latex by emulsion polymerizing (a) about 50 to about 90 parts by weight of vinylidene chloride, (b) about 10 to about 50 parts by weight of a copolymerizable ethylenically unsaturated comonomer, and (c) a minor amount of a copolymerizable crosslinking polyfunctional comonomer, wherein the microgels in the resulting latex have a gel content of about 25 to 99 percent and a second order transition temperature of at least about 30° C., and

(II) recovering the microgel powder from the latex;

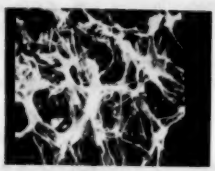
wherein the microgels prior to recovery have a diameter less than about 1 micron.

4,232,130

FILTER ELEMENTS

Samuel Baxter, Penhow, England, and Pushpkumar D. Cuangani, Glasgow, Scotland, assignors to Monsanto Chemicals Limited, London, England

Division of Ser. No. 486,549, Jul. 8, 1974, which is a continuation of Ser. No. 193,790, Oct. 29, 1971, abandoned. This application Dec. 22, 1975, Ser. No. 643,287
Claims priority, application United Kingdom, Nov. 18, 1970, 54806/70; Apr. 16, 1971, 9646/71
Int. Cl.³ C08J 9/00, 9/14
U.S. Cl. 521—143 6 Claims



1. A foam product comprising polypropylene or high density polyethylene, said foam having a substantially open-cell structure wherein a majority of the cells have a diameter ranging from 40 to 1000 microns with more than half of the cell walls present containing one or more perforations, and wherein the microstructure of said foam is characterized by the presence of fiber elements which bridge across said perforations in the cell walls.

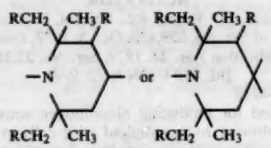
4,232,131

POLYMERIC LIGHT STABILIZERS FOR PLASTICS

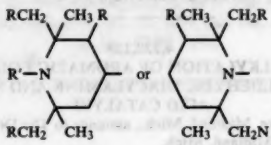
Jean Rody, Basel, and Michael Rasberger, Riehen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 896,676, Apr. 14, 1978, abandoned, which is a continuation of Ser. No. 793,708, May 4, 1977, abandoned. This application Nov. 13, 1978, Ser. No. 959,783
Claims priority, application Switzerland, May 11, 1976, 5890/76
Int. Cl.³ C08L 77/00
U.S. Cl. 525—184 21 Claims

1. A polyamide, the recurrent molecular unit of which contains a polyalkylpiperidine radical of the formula



or is substituted by a polyalkylpiperidine side group of the formula



in which R denotes hydrogen or alkyl with 1–5 C atoms and R' denotes hydrogen, alkyl with 1–12 C atoms, alkenyl with 3–8 C atoms, alkinyl with 3–6 C atoms, aralkyl with 7–12 C atoms, alkanoyl with 1–8 C atoms or alkenoyl with 3–5 C atoms, and copolymers thereof with polyalkylpiperidine-free components.

4,232,132

ELASTOMERIC THERMOPLASTIC MIXTURES OF POLYPROPYLENE AND ETHYLENE/VINYL ACETATE COPOLYMERS

Ulrich Grigo, Krefeld; Josef Merten, Korschenbroich, and Rudolf Binsack, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Fed. Rep. of Germany

Filed Mar. 12, 1979, Ser. No. 19,788
Claims priority, application Fed. Rep. of Germany, Mar. 16, 1978, 2811550
Int. Cl.² C08L 23/12, 31/04
U.S. Cl. 525—222 6 Claims

1. An elastomeric thermoplastic mixture consisting of

(A) from 40 to 95% by weight of polypropylene which is greater than 90% isotactic and

(B) from 5 to 60% by weight of an ethylene/vinyl acetate copolymer having a vinyl acetate content of from 20 to 80% by weight, said copolymer having been partially cross-linked to a gel content of 3 to 50% by weight before admixture with said polypropylene.

4,232,133

POLYISOCYANURATE CONTAINING MOLDING COMPOSITIONS

L. James Ferrarini, Jr., West Chester, Pa., and Joseph Feltzin, Wilmington, Del., assignors to ICI Americas Inc., Wilmington, Del.

Filed Jul. 27, 1978, Ser. No. 928,690
Int. Cl.³ C08L 75/04
U.S. Cl. 525—452 22 Claims

1. A resin blend useful in preparing non-sticky molding

compositions by the reaction therewith of polyisocyanates which comprises:

5–95% by weight of polyethylenically unsaturated polyisocyanurate resin having a molecular weight in the range of 2,000–200,000,

5–95% by weight of an ethylenically unsaturated monomer, and;

1.5–30% by weight of a relatively non-polar polyol free of ethylenic unsaturation having a molecular weight in the range of 300–2,000 selected from the group consisting of polyols of polyethylene glycol, polypropylene glycol, polytetramethylene glycol, aromatic ethers which are condensation products of propylene oxide and aromatic polyols, and dihydroxy terminateed polyesters derived from glycols or polyether glycols and dicarboxylic acids.

4,232,134
PROCESS FOR ISOLATING BORON-CONTAINING PHENOL/FORMALDEHYDE RESINS

Manfred Schmidt; Eberhard Bandtel, both of Krefeld; Walter Traudisch, Leverkusen; Georg Spott, and Dieter Freitag, both of Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Fed. Rep. of Germany

Filed Nov. 6, 1979, Ser. No. 91,823

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1978, 2849115

Int. Cl.³ C08G *8/10, 8/20, 8/28*

U.S. Cl. 525—506 **9 Claims**

1. A process for isolating boron-containing phenol/formaldehyde resins from their reaction media which, in addition to the end product, also contains starting compounds and solvents used, characterised in that isolation is carried out by concentration through evaporation in a spiral flow evaporator which has the following characteristics:

$$A \text{ which represents } \frac{\text{throughput}}{\text{tube cross section}} \quad \frac{\text{kg}}{\text{h} \cdot \text{mm}^2} =$$

from 0.1 to 1.5 and

$$B \text{ which represents } \frac{\text{throughput}}{\text{evaporation surface}} \quad \frac{\text{kg}}{\text{h} \cdot \text{mm}^2} =$$

from 100 to 400.

4,232,135
COATING COMPOSITIONS

John Bentley, Taplow, and Morice W. Thompson, Maidenhead, both of England, assignors to Imperial Chemical Industries Limited, London, England

Filed Dec. 26, 1978, Ser. No. 972,899

Claims priority, application United Kingdom, Jan. 10, 1978, 871/78

Int. Cl.³ C08L *51/00, 53/00, 61/20, 67/00*

U.S. Cl. 525—509 **10 Claims**

1. A coating composition in which the film-forming material consists of:

(a) from 30% to 85% by volume of disperse phase consisting of particles having a size or size distribution in the range 0.01–20 microns, not less than 50% by volume of those particles being polymer microparticles, and the disperse phase being in a state of stable dispersion in

(b) from 70% to 15% by volume of a liquid continuous phase which is capable of curing to a film-forming polymeric material by means of a condensation polymerisation reaction, the said state of stable dispersion being a substantially de-floculated, sterically stabilised state achieved by means of a dispersing agent the molecule of which contains a polymeric component which is solvatable by the continuous phase liquid and another component which is relatively non-solvated thereby and is capable of associating with the surface of the microparticles,

the total volume of components (a) and (b) being 100% and the disperse phase being capable of taking part in the said condensation polymerisation reaction.

4,232,136
PROCESS FOR THE CONTROLLED HARDENING OF UNSATURATED POLYESTER RESINS

István Kovácsay; Mária Szajkó née Lőrinczi; István Dubovszky; László Magdányi, all of Budapest; Ferenc Szaller, Budaors, and Ede Szatmári, Budapest, all of Hungary, assignors to Muanyagipari Kutato Intezet and Finomvegyszer Szovetkezet, both of Budapest, Hungary, part interest to each

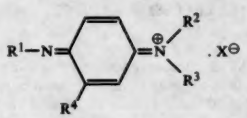
Filed Feb. 27, 1979, Ser. No. 15,736

Claims priority, application Hungary, Jun. 3, 1978, MU 597

Int. Cl.³ C08F *18/00, 118/14*

U.S. Cl. 525—327 **4 Claims**

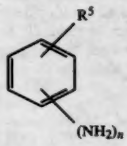
1. A process for the controlled hardening of unsaturated polyester resins at temperatures of −5° C. to +150° C. using an organic peroxide initiator optionally along with an accelerator and/or promotor, characterized in that an organic dyestuff of the formula



(I)

wherein

R^1 stands for a group of the formula



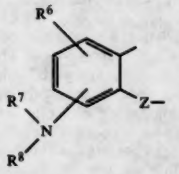
(II)

and in this formula R^5 is C_{1-4} alkyl and n is an integer from 1 to 3,

R^2 and R^3 each represent C_{1-4} alkyl,

R^4 stands for hydrogen, or

R^1 and R^4 form together a group of the formula



(III)

and in this formula R^6, R^7 and R^8 each represent hydrogen or C_{1-4} alkyl and Z stands for oxygen or sulfur or —NH—, and

X stands for chlorine or bromine, is admixed with a said polyester resin and/or said organic peroxide in an amount of 0.001 to 0.05% by weight, calculated on the weight of the polyester resin.

4,232,137

COOLING AN ALPHA-METHYLSTYRENE POLYMERIZATION MASS

Howard B. Irvin; Ronnie L. Lewis, and George A. Moczygemba, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 14, 1978, Ser. No. 942,214
Int. Cl. C08F 2/06
U.S. Cl. 526—71 9 Claims

1. A method for producing a polymeric mass from an alpha-methylstyrene which comprises preparing a solution of it in an inert diluent, the inert diluent having two components other than said alpha-methyl styrene and being composed of at least one solvent of a character and present in the solution in an amount sufficient to maintain a polymer when produced in solution in the polymeric mass and a liquid component which is readily vaporizable under the desired conditions of polymerization, said component being of a character and being present in an amount such as to remove by vaporization of at least a portion thereof undesirable or excess heat from the reaction mass and then producing said mass under polymerization conditions including the vaporization of said portion of said component.

4,232,138

OLEFIN POLYMERIZATION CATALYST

David E. Boone, Lisle, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Continuation of Ser. No. 751,441, Dec. 16, 1976, abandoned. This application Dec. 19, 1977, Ser. No. 861,869
Int. Cl.[3] C08F 4/02, 10/02
U.S. Cl. 526—122 10 Claims

1. A supported alpha-olefin polymerization catalyst component formed by (A) reacting magnesium hydroxide with antimony pentachloride in a molar ratio of about 10:1 to about 1:5 for about 5 to about 100 hours at about 20° to 130° C. and (B) reacting the resulting product (1) with a Group IVB or VB transition metal compound for about 1 to 100 hours at about 20° to 130° C., the molar ratio of said transition metal compound to said Group II metal compound being about 1:30 to about 5:1, and (2) with an aluminum trihalide selected from the group consisting of aluminum trichloride or aluminum tribromide for about 3 to 100 hours at about 20° to 130° C., the molar ratio of said aluminum trihalide to said magnesium hydroxide being about 1:10 to about 10:1.

4,232,139

PROCESS FOR PRODUCING POLYMERS OR COPOLYMERS OF OLEFINS CONTAINING AT LEAST 3 CARBON ATOMS

Syuji Minami, Ohtake, and Norio Kashiwa, Iwakuni, both of Japan, assignors to Mitsui Petrochemical Industries Ltd., Tokyo, Japan

Filed May 27, 1977, Ser. No. 801,234
Claims priority, application Japan, Jun. 2, 1976, 51-63536
Int. Cl.[3] C08F 4/02, 10/06
U.S. Cl. 526—125 9 Claims

1. A process for producing a polymer or copolymer of an olefin containing at least 3 carbon atoms which comprises polymerizing or copolymerizing at least one olefin containing at least 3 carbon atoms, or copolymerizing the olefin with up to 10 mole% of ethylene and/or a diolefin, in the presence of a catalyst composed of (A) a magnesium-containing solid titanium composition and (B) an organo-aluminum compound; characterized in that the solid titanium composition (A) is a composition consisting essentially of the product formed by contacting (i) a halogen-containing magnesium organo-aromatic compound of the formula $Mg(OR)Cl$ wherein R represents a radical selected from the group consisting of phenyl, naphthyl, lower alkyl-substituted phenyl, lower alkyl-substituted naphthyl, lower alkoxy-substituted phenyl, lower alkoxy-substituted naphthyl, halogen-substituted phenyl, halogen-substituted naphthyl, phenyl lower alkyl, lower alkyl-substituted phenyl lower alkyl, lower alkoxy-substituted phenyl lower alkyl and halogen-substituted phenyl lower alkyl, with (ii) an organic acid ester at a temperature of about 0° to 200° C. in the absence of mechanical pulverization, and further contacting the resultant product with (iii) a tetravalent titanium compound of the formula $Ti(OR')_gX_{4-g}$ wherein R' is an alkyl group containing 1 to 8 carbon atoms, X is a halogen atom and g is 0 to 4, at room temperature to 130° C. in the absence of mechanical pulverization, so as to form the solid titanium composition in which the amounts of titanium, magnesium, halogen and organic acid ester are respectively 1–5% by weight, 10–25% by weight, 40–65% by weight and 5–20% by weight, said organic acid ester (ii) being a member selected from the group consisting of

(a) esters formed between carboxylic acids or halogensubstituted derivatives selected from saturated or unsaturated aliphatic carboxylic acids containing 1 to 18 carbon atoms and halogen-substituted derivatives thereof and alcohols or phenols selected from saturated or unsaturated aliphatic primary alcohols containing 1 to 18 carbon atoms, saturated or unsaturated alicyclic alcohols containing 3 to 8 carbon atoms, phenols containing 6 to 10 carbon atoms and C_1–C_4 saturated or unsaturated aliphatic primary alcohols bonded to the ring carbon atom of a C_3–C_{10} aliphatic or aromatic ring,

(b) aliphatic lactones containing 3 to 10 carbon atoms,

(c) an ester formed between an alicyclic carboxylic acid containing 6 to 12 carbon atoms and a saturated aliphatic primary alcohol containing 1 to 8 carbon atoms,

(d) esters formed between aromatic carboxylic acids containing 7 to 18 carbon atoms and alcohols or phenols selected from saturated or unsaturated aliphatic primary alcohols containing 1 to 18 carbon atoms, saturated or unsaturated alicyclic alcohols containing 3 to 8 carbon atoms, phenols containing 6 to 10 carbon atoms and C_1–C_4 saturated or unsaturated aliphatic primary alcohols bonded to the ring carbon atoms of a C_3–C_{10} aliphatic or aromatic ring, and

(e) aromatic lactones containing 8 to 12 carbon atoms and the organo-aluminum compound (B) is selected from the group consisting of trialkyl aluminum, alkenyl aluminum, alkyl aluminum alkoxide, alkyl aluminum hydride and alkyl aluminum halide.

4,232,140

PROCESS FOR POLYMERIZING OLEFINS

Morris R. Ort, Wilbraham, Mass., assignor to Cities Service Company, Tulsa, Okla.

Division of Ser. No. 573,695, May 1, 1975, abandoned. This application Oct. 23, 1978, Ser. No. 953,715
The portion of the term of this patent subsequent to May 11, 1993, has been disclaimed.
Int. Cl.[3] C08F 2/34, 4/02, 10/02
U.S. Cl. 526—129 8 Claims

1. In a process for preparing non-rubbery, semicrystalline polymers and copolymers by contacting an ethylene-containing stream with a supported catalyst comprising (a) a vanadium chloride and (b) at least one alkylaluminum compound of the formula $R_nAl(OR)_{3-n}$, wherein R is an alkyl group containing 1–12 carbons and n is 0.5–3.0, on (c) an anhydrous inert inorganic support material under gas-phase polymerization conditions in the presence of hydrogen, the improvement which comprises conducting the polymerization in the presence of trichlorofluoromethane.

4,232,141

METHOD FOR THE PREPARATION OF VINYL CHLORIDE POLYMERS

Shunichi Koyanagi; Hajime Kitamura, and Kazuhiko Kurimoto, all of Ibaragi, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Japan

Filed Jul. 18, 1978, Ser. No. 925,704
Claims priority, application Japan, Jul. 29, 1977, 52-91194
Int. Cl.[3] C08F 2/20, 14/06
U.S. Cl. 526—344.2 9 Claims

1. In a method for the polymerization of vinyl chloride monomer or a monomer mixture mainly composed of vinyl chloride dispersed in an aqueous polymerization medium containing a water-soluble suspending agent as dissolved therein and in the presence of a water-insoluble polymerization initiator which is solid at room temperature, the improvement comprising the steps of:

(a) first grinding coarser particles of the polymerization initiator in an aqueous medium containing a dispersing agent to form an aqueous dispersion of the polymerization initiator having a particle size not exceeding 50 μm, and then

(b) introducing the aqueous dispersion of the polymerization initiator into the aqueous polymerization medium for the polymerization of the monomer or monomers over a duration equal to or less than one-tenth of the half-life period of the polymerization initiator at the temperature of the polymerization mixture while the polymerization mixture is maintained at a temperature in the range of from room temperature to a temperature which which the half-life period of the polymerization initiator is at least 120 minutes.

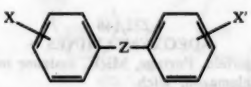
4,232,142

PRODUCTION OF POLYARYLENE ETHER SULPHONES AND KETONES

Dennis A. Barr, Welwyn, and John B. Rose, St. Albans, both of England, assignors to Imperial Chemical Industries Limited, Great Britain

Division of Ser. No. 335,902, Feb. 26, 1973, Pat. No. 4,051,109, which is a continuation-in-part of Ser. No. 580,290, Sep. 19, 1966, abandoned. This application Nov. 18, 1975, Ser. No. 632,979
Claims priority, application United Kingdom, Sep. 24, 1965, 40734/65; Jan. 31, 1966, 4176/66; Jan. 31, 1966, 4177/66; Jan. 31, 1966, 4178/66; Mar. 7, 1966, 9764/66
Int. Cl.[3] C08G 65/38
U.S. Cl. 528—125 11 Claims

1. A process for preparing an aromatic polymer which comprises heating a condensed oligomer obtained by reaction in a solvent of a dihalo benzenoid compound of the formula



wherein Z represents $-SO_2$ or —CO—; X and X' are halogen atoms which are ortho or para to Z with a substantially equivalent amount of an alkali metal hydroxide followed by removal of solvent; said condensed oligomer being heated at 200°-400° C. under a nonreactive atmosphere in the substantial absence of a solvent.

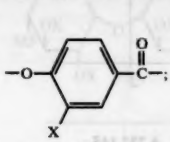
4,232,143

POLYESTER WHICH EXHIBITS ANISOTROPY IN THE MELT CONTAINING p-OXYBENZOYL UNITS AND 4,4'-DIOXYBENZOPHENONE UNITS OR METHYL AND CHLORO DERIVATIVES THEREOF

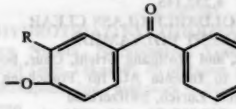
Robert S. Irwin, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 17, 1979, Ser. No. 76,800
Int. Cl.[3] C08G 63/60
U.S. Cl. 528—128 15 Claims

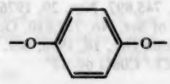
1. Fiber-forming copolyesters consisting essentially of units I, II, III and IV having the structural formulas:



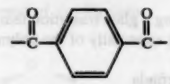
I



II



III



IV

where X and R are independently hydrogen, methyl- or chloro-, with the proviso that when X is methyl-, R is hydrogen or methyl-, and when X is chloro-, R is hydrogen or chloro-, in the proportions of about 54–70 mol % of Unit I, about 10–16 mol % of Unit II, from 0 to about 8 mol % of Unit III and an amount of Unit IV equivalent on a molar basis to Units II and III.

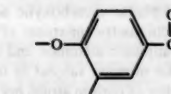
4,232,144

POLYESTER WHICH EXHIBITS ANISOTROPY IN THE MELT CONTAINING P-OXYBENZOYL UNITS AND 4-OXY-3'-CARBONYLBENZOPHENONE UNITS OR METHYL AND CHLORO DERIVATIVES OF SAID UNITS

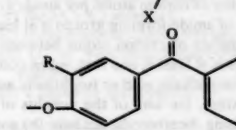
Robert S. Irwin, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 17, 1979, Ser. No. 76,797
Int. Cl.[3] C08G 8/02, 63/60
U.S. Cl. 528—128 16 Claims

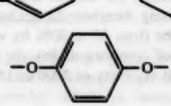
1. Fiber-forming copolyesters consisting essentially of Units I, II, III and IV having the structural formulas:



I

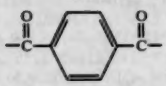


II



III and

-continued



IV

where X and R are independently hydrogen, methyl- or chloro-, in the proportions of about 56–70 mol % of Unit I, about 10–20 mol % of Unit II, from 7 to about 12 mol % of Unit III and an amount of Unit IV equivalent on a molar basis to Unit III.

4,232,145

INJECTION MOLDABLE GLASS CLEAR TRANSPARENT POLYAMIDE

Eduard Schmid, Bonaduz, and Wolfgang Griehl, Chur, both of Switzerland, assignors to Inventa AG fur Forschung und Patentverwertung, Zurich, Zurich, Switzerland

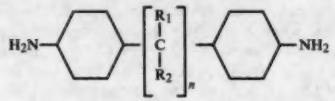
Continuation of Ser. No. 745,897, Nov. 29, 1976, abandoned, which is a continuation of Ser. No. 731,810, Oct. 12, 1976, abandoned. This application Dec. 18, 1978, Ser. No. 970,643

Int. Cl.³ C08G *69/36*

U.S. Cl. 528—324 **19 Claims**

1. A copolyamide having a glass transition temperature (Tg) of 140°–170° C. consisting essentially of the polymeric condensation product of

(a) a diamine of the formula



wherein R_1 and R_2 are independently selected from the group consisting of hydrogen and methyl, n is an integer from 0 to 6, and wherein each cyclohexane ring may be partially or wholly substituted with methyl groups;

(b) a substantially stoichiometric amount, based on the amount of component (a), of a dicarboxylic acid or acid mixture, consisting of from 50 to 100% of isophthalic acid, from 0 to 50 mol or weight % of terephthalic acid, and from 0 to 15 mol % of other polyamide-forming dicarboxylic acid or acids; and

(c) 30 to 40% by weight, based on the total weight of components (a), (b) and (c), of a further polyamide-forming component which is selected from the group consisting of amino lauric acid, laurolactam and aminoundecanoic acid, some of said group may be replaced by a member of the class consisting of aliphatic dicarboxylic acids and aliphatic diamines, stoichiometric mixtures of aliphatic dicarboxylic acids and aliphatic diamines, and blends of said salts and mixtures, said member subject to the conditions that the average number of carbon atoms per amide group or between each pair of amide-forming groups is at least 9, that the minimum number of carbon atoms between the amide-forming groups is at least 6, and that, when component (b) is not 100% isophthalic acid or isophthalic acid/-terephthalic acid mixture, the sum of the weights of the other polyamide-forming dicarboxylic acids in (b) and of component (c) must be from 30 to 40% by weight, based on the total weight of components (a), (b) and (c), said product having a melt viscosity of 2000 to 15000 poises at about 300° C.

4,232,146

PROCESS FOR PREPARING LAYERED ORGANOPHOSPHORUS INORGANIC POLYMERS

Peter M. Di Giacomo, Mission Viejo, and Martin B. Dines, Santa Ana, both of Calif., assignors to Occidental Research Corporation, Irvine, Calif.

Filed Sep. 26, 1978, Ser. No. 945,971

Int. Cl.² C08G *79/04, 79/00*

U.S. Cl. 528—395 **38 Claims**

1. A process for the production of phosphous containing organo substituted inorganic polymers which comprises reacting in a liquid medium at least one organophosphorus acid compound of the formula:

$$[(HO)_2OP]_nR$$

wherein n is 1 or 2 and R is an organo group covalently coupled to phosphorus with at least one tetravalent metal ion selected from the group consisting of zirconium, cerium, thorium, uranium, titanium, lead and mixtures thereof to precipitate, from the liquid medium, a solid inorganic polymer in which the molar ratio of phosphorus to tetravalent metal is about 2 to 1, the organo group is covalently bonded to phosphorus and phosphorus is linked to the tetravalent metal through oxygen.

4,232,147

4-N-ACYLFORTIMICIN B-1,5-CARBAMATES

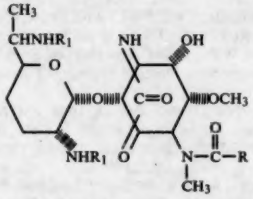
John S. Tadanier, and Jerry R. Martin, both of Waukegan, Ill., assignors to Abbott Laboratories, North Chicago, Ill.

- Filed Sep. 26, 1979, Ser. No. 79,143

Int. Cl.³ C07H *17/00*

U.S. Cl. 536—4 **7 Claims**

1. A 4-N-acylfortimicin B-1,5-carbamate represented by the formula



wherein R is acyl and R_1 is hydrogen or benzyloxycarbonyl.

4,232,148

6-DEOXYNEAMINES

Barney J. Magerlein, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 885,872, Mar. 13, 1978, and a continuation-in-part of Ser. No. 830,684, Sep. 6, 1977. This application Mar. 5, 1979, Ser. No. 17,114

Int. Cl.³ C07H *15/22*

U.S. Cl. 536—17 R **65 Claims**

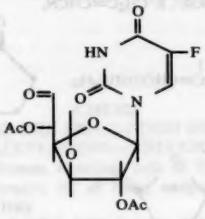
1. 3',4'-Di-O-acetyl-1,2',3,6'-tetrakis-N-(trifluoroacetyl)-neamine.

4,232,149
1-(5-FLUORURACIL-1)-2,5-DI-O-ACETYL-β-D-GLUCOFURANURONO-6,3-LACTONE

Ruta A. Paegle, ulitsa Fr. Tiesnieka, 2, kv. 2; Marger J. Lidaka, ulitsa Mezhotnes, 37, kv. 1; Regina A. Zhuk, ulitsa Gorkogo, 77, kv. 20; Juris A. Maurinsh, ulitsa Olgas, 3, kv. 7; Aina A. Zidermane, ulitsa Engelsa, 111-a, kv. 9, and Marite K. Kilevitsa, ulitsa Dzelzavas, 59, kv. 13, all of Riga, U.S.S.R.

Filed Jul. 27, 1978, Ser. No. 928,659
Claims priority, application U.S.S.R., Aug. 2, 1977, 2526564
Int. Cl.³ C07H *17/00*; A61K *31/70*
U.S. Cl. 536—23 1 Claim

1. 1-(5-Fluoruracil-1)-2,5-di-O-acetyl-β-D-glucofuranurono-6,3-lactone having the formula

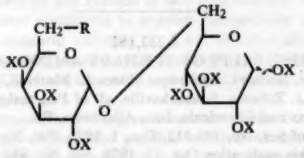


4,232,150
OLIGOSACCHARIDE PRECURSORS TO SUBSTITUTED O-α-D AND O-β-D-MULTIGALACTOPYRANOSYL AND GLUCOPYRANOSYL 1→4 AND 1→6 GALACTOPYRANOSYL 1→6α-D-GLUCOPYRANOSES

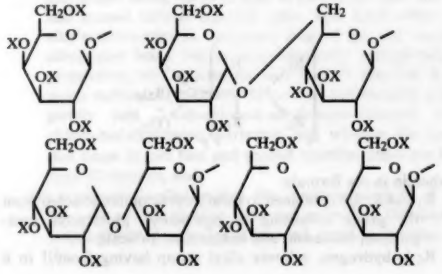
Vijay G. Nair, New York, N.Y.; Joseph P. Joseph, Montvale, N.J., and Seymour Bernstein, New City, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Jul. 9, 1979, Ser. No. 55,852
Int. Cl.³ C07H *13/02*
U.S. Cl. 536—119 13 Claims

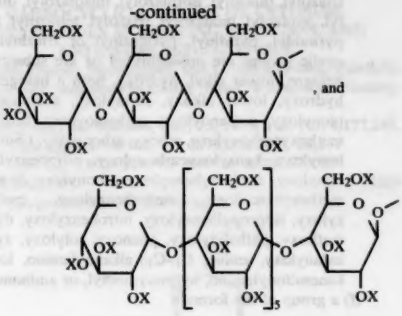
1. A compound of the formula:



wherein X is selected from the group consisting of hydrogen and $COCH_3$; and R is selected from the group consisting of



-continued

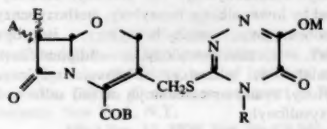


4,232,151
DIHYDROTRIAZINYLTHIOOXACEPHALOSPORINS

Wataru Nagata, Nishinomiya; Yoshio Hamashima, Kyoto; Teruji Tsuji, Takasuki, all of Japan, and William H. W. Lunn, Indianapolis, Ind., assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Jul. 13, 1978, Ser. No. 924,375
Claims priority, application Japan, Jul. 14, 1977, 52-84715
Int. Cl.³ C07D *498/00*
U.S. Cl. 544—90 56 Claims

1. A compound of the formula



wherein R is lower alkyl; E is hydrogen or methoxy; M is hydrogen or a hydroxy protecting group; COB is carboxy, protected carboxy or a carboxy salt; and A is

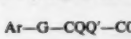
(1) azido, isocyanato, isocyano;
(2) amino;
(3) trimethylsilylamino, methoxydimethylsilylamino, dimethoxymethylsilylamino or trimethylstannylamino;
(4) a hydrocarbonated amino group selected from the group consisting of 1-carbethoxy-1-propen-2-ylamino, 1-carbamoyl-1-propen-2-ylamino, 1-N-phenylcarbamoyl-1-buten-2-ylamino, 1-propen-2-ylamino, 1-phenylpentene-2-ylamino, methylamino, t-butylaminotritylamino, methylideneamino, ethylideneamino, 1-halo-2-phenylethylideneamino, 1-chlorobenzylideneamino, 1-methoxybenzylideneamino, 1-loweralkoxy-2-phenylethylideneamino, 1-loweralkoxy-2-phenoxyethylideneamino and di-t-butyl-4-hydroxybenzylideneamino;
(5) a diacylamino derived from a C_4 to C_{10} polybasic carboxylic acid;
(6) a o-nitrophenylsulfenylamino group; or
(7) an acylamino group wherein the acyl group is
(a) C_1–C_{10} alkanoyl or benzoyl;
(b) halo-C_1–C_4 alkanoyl;
(c) trifluoromethylthioacetyl or cyanoacetyl;
(d) (2- or 4-pyridon-1-yl)acetyl or (2-iminothiazolin-4-yl)acetyl;
(e) a group of the formula

Ar—CQQ′—CO—

wherein Q and Q′ are hydrogen or methyl; Ar is a cyclic group selected from phenyl, dihydrophenyl, furyl, thienyl, pyrrolyl, oxazolyl, isoxazolyl, oxadiazolyl, oxa-

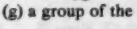
triazolyl, thiazolyl, isothiazolyl, thiadiazolyl, thiatriazolyl, pyrazolyl, imidazolyl, triazolyl, tetrazolyl, pyridyl, pyrimidyl, pyridinyl, pyridazinyl or triazinyl which cyclic groups are unsubstituted or are substituted by halogen, lower alkyl, hydroxy, both a halogen and a hydroxy, lower alkoxy, formyloxy, acetyloxy, propionyloxy, pentanoyloxy, carbamoyloxy, benzoyloxy, methoxycarbonyloxy, ethoxycarbonyloxy, t-butoxycarbonyloxy, benzyloxycarbonyloxy, nitrobenzyloxycarbonyloxy, methoxybenzyloxycarbonyloxy, benzyloxy, methoxybenzyloxy, aminobenzyloxy, methylbenzyloxy, isopropylbenzyloxy, nitrobenzyloxy, diphenylmethoxy, phthalidyloxy, phenoxy, tolyloxy, xylyloxy, indanyloxy, amino, C_1–C_{10} alkanoylamino, lower alkanesulfonylamino, hydroxymethyl, or aminomethyl;

(f) a group of the formula



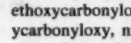
wherein Ar, Q and Q′ are the same as defined above and G is oxygen or sulfur;

(g) a group of the formula



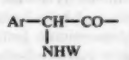
wherein Ar is the same as defined above; T is (i) hydroxy, formyloxy, acetyloxy, propionyloxy, pentanoyloxy, carbamoyloxy, benzoyloxy, methoxycarbonyloxy, ethoxycarbonyloxy, t-butoxycarbonyloxy, benzyloxycarbonyloxy, nitrobenzyloxycarbonyloxy or methoxybenzyloxycarbonyloxy; (ii) carboxy, carboxy protected by lower alkoxy, benzyloxy, methoxybenzyloxy, aminobenzyloxy, methylbenzyloxy, isopropylbenzyloxy, nitrobenzyloxy, diphenylmethoxy, phthalidyloxy, phenoxy, tolyloxy, xylyloxy, indanyloxy, cyano or carbamoyl; or (iii) sulfo or lower alkoxysulfonyl;

(h) a group of the formula

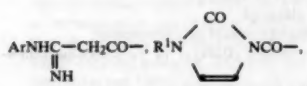


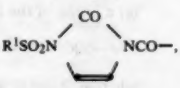
wherein L is t-butyl, 1,1-dimethylpropyl, cyclopropylmethyl, 1-methylcyclohexyl, isobornyl, ethoxy-t-butyl, 2-alkanesulfonylethyl, 2,2,2-trichloroethyl, benzyl, methoxybenzyl, nitrobenzyl, aminobenzyl, diphenylmethyl, tolylmethyl, phenyl, xylyl or pyridylmethyl;

(i) a group of the formula

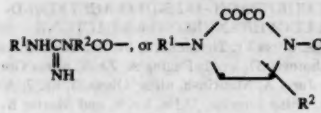


wherein Ar is the same as defined above; W is C_1–C_{10} alkanoyl, halo-C_1–C_4 alkanoyl, or a group represented by the formula Ar—CQQ′—CO— as defined above, Ar—CO—, LOCO—,



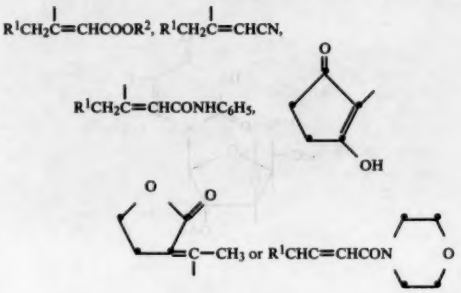


$R^1NHCONR^2$—CO—, $R^1NHCSNR^2CO$—,



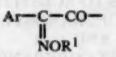
wherein Ar and L are as defined above and R^1 and R^2 are hydrogen, C_1–C_4 alkyl, or C_1–C_{10} alkanoyl; or

W is an enolic group of active carbonyl compounds represented by the formula



wherein R^1 and R^2 are the same as defined above; or NHW is phthalimido or succinimido;

(j) an acyl group of the formula



wherein Ar and R^1 are the same as defined above; or

(k) a 5-aminoadipoyl group in which the carboxy or amino group is optionally protected with a conventional carboxy or amino protecting group;

and when A is amino or an acyl group having an amino substituent, an acid addition salt of the compounds represented thereby; provided that when E is methoxy, E is in the 7-alpha position on the cephem ring.

4,232,152

AMINE SALTS OF TERTIARY AMINO ACIDS

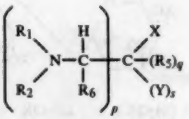
Ibrahim S. Bechara, Boothwyn; Rocco L. Mascioli, Media, and Philip J. Zaluska, Schnecksville, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Division of Ser. No. 746,313, Dec. 1, 1976, Pat. No. 4,134,994. This application Oct. 23, 1978, Ser. No. 954,131

Int. Cl.[3] **C07D** *295/314, 233/06, 233/60*

U.S. Cl. 544—119 **4 Claims**

1. An amine salt of a tertiary amino acid represented by the formula:



wherein in the formula:

R_1 and R_2 are combined to form a cyclic amine selected from the group consisting of piperidinyl, piperizinyl, morpholino, imidazolo and imidazolino radicals;

R_5 is hydrogen, a lower alkyl group having from 1 to 6

carbon atoms, an alkenyl group having from 2 to 6 carbon atoms, an aryl group, a cycloaliphatic or alkyl substituted cycloaliphatic group with the alkyl portion having from 1 to 6 carbons, or a keto alkyl group with the alkyl portion having from 1 to 6 carbon atoms;

R_6 is hydrogen, or a radical selected from the group consisting of alkyl, phenyl and napthyl groups;

X is an amine salt of a carboxylic acid group;

Y is a nitrile group; and

p, q, and s are each 1.

4,232,153

PROCESS FOR THE PRODUCTION OF CHLORO-DI (ALKYLAMINO)-s-TRIAZINES

Luciano Baldi; Renato Francese, both of Turin, and Franco Collecchia, Borgaro, all of Italy, assignors to Rumianca S.p.A., Turin, Italy

Filed Jul. 7, 1978, Ser. No. 922,698

Claims priority, application Italy, Jul. 7, 1977, 25474 A/77

Int. Cl.[3] C07D *251/50*

U.S. Cl. 544—204 **22 Claims**

1. In a process for the preparation of chloro-bis(alkylamino)-s-triazine by means of stepwise replacement of two chlorine atoms of cyanuric chloride with alkylamino groups at a temperature not exceeding 90° C. during the first replacement of a chlorine atom and at a temperature not exceeding 100° C. during the second replacement of a chlorine atom, the improvement which comprises;

(a) continuously feeding cyanuric chloride in the form of a solution in an inorganic solvent to the inlet end of a first tubular reaction zone, continuously feeding an inorganic base, a first alkylamine and water to said first tubular reaction zone, said inorganic base and said first alkylamine being fed in at least in part at the inlet end of said first reaction zone, said cyanuric chloride, inorganic base and first alkylamine being fed in in substantially stoichiometric proportions and reacted in said first reaction zone under turbulent conditions to convert substantially completely said cyanuric chloride to 2,4-di-chloro-6-alkylamino-s-triazine, and continuously discharging the reaction product of (a) from the outlet end of said first tubular reaction zone;

(b) continuously feeding said reaction product of (a), upon possible cooling and possible removal of aqueous phase from said reaction product of (a), to the inlet end of a second tubular reaction zone, continuously feeding to said second reaction zone an inorganic base, a second alkylamine and water, said inorganic base of (b) and said second alkylamine being fed in at least in part at the inlet end of said second tubular reaction zone, said 2,4-di-chloro-6-alkylamino-s-triazine, inorganic base of (b) and second alkylamine being fed in in substantially stoichiometric proportions and reacted in said second reaction zone under turbulent conditions to convert substantially completely said 2,4-di-chloro-6-alkylamino-s-triazine into chloro-bis(alkylamino)-s-triazine; and wherein the reaction times in said first and second reaction zones are less than 10 minutes; and

(c) continuously discharging the reaction product of (b) from the second reaction zone and recovering the chloro-bis(alkylamino)-s-triazine from said reaction product of (b).

4,232,154

CARBOCYCLIC ANALOGS OF CYTOSINE NUCLEOSIDES EXHIBITING ANTIVIRAL AND ANTINEOPLASTICACTIVITY

Y. Fulmer Shealy, Birmingham, and C. Allen O'Dell, Fairfield, both of Ala., assignors to United States of America, Washington, D.C.

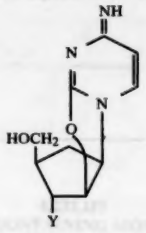
Division of Ser. No. 860,086, Dec. 13, 1977, Pat. No. 4,177,348.

This application Jul. 17, 1979, Ser. No. 58,177

Int. Cl.[2] C07D *239/46, 498/04;* A61K *31/505*

U.S. Cl. 544—250 **1 Claim**

1. A compound having the formula



wherein Y is hydrogen or hydroxy.

4,232,155

PURINE COMPOUNDS

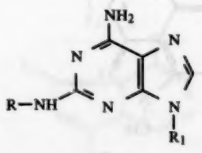
Takayuki Naito, Kawasaki; Susumu Nakagawa, Tokyo; Tetsuro Yamasaki; Taka-Aki Okita, both of Ichikawa, and Haruhiro Yamashita, Tokyo, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.

Filed Sep. 13, 1979, Ser. No. 74,849

Int. Cl.[3] C07D *473/16*

U.S. Cl. 544—277 **5 Claims**

1. A compound having Formula I



(I)

wherein

R is lower alkyl of 1 to 4 carbon atoms inclusive or cyclohexyl;

R_1 is cyclohexyl or 2-cyclohexenyl; or a pharmaceutically acceptable acid addition salt thereof.

4,232,156

ACYL-PYRIMIDINES

Ivon Flament, Petit-Lancy, Switzerland, assignor to Firmenich, S.A., Geneva, Switzerland

Division of Ser. No. 867,367, Jan. 6, 1978, Pat. No. 4,166,869.

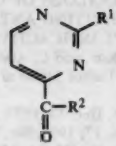
This application Feb. 2, 1979, Ser. No. 9,390

Claims priority, application Switzerland, Jan. 10, 1977, 227/77

Int. Cl.[3] C07D *239/24*

U.S. Cl. 544—335 **5 Claims**

1. A compound of formula



(I')

wherein either symbol R^1 represents a hydrogen atom and R^2 stands for an isobutyl radical, or symbol R^1 represents a methyl radical and R^2 stands for a methyl, an ethyl or an isobutyl radical.

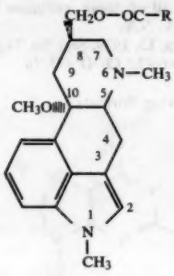
4,232,157

PROCESS FOR PREPARING LYSERGOL DERIVATIVES

Corvi M. Enrico, Via Scalabrini 49, 29100 Piacenza, Italy

Filed Apr. 3, 1979, Ser. No. 26,685
Claims priority, application Italy, Apr. 5, 1978, 22011 A/78
Int. Cl.³ C07D *457/02*
U.S. Cl. 546—68 **7 Claims**

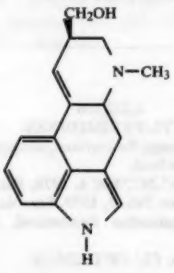
1. A process for preparing a compound of the formula:



(I)

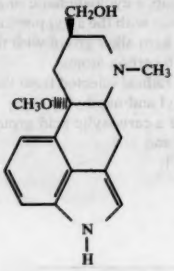
wherein R is the radical of an organic carboxylic acid selected from the group consisting of nicotinic acid, 5-bromo-nitocinic acid and 2-furoic acid, said process comprising:

(a) converting lysergol, having the formula:



(IX)

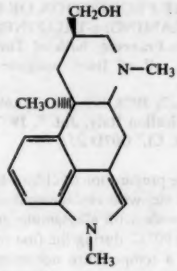
to 10-alpha-methoxy-lumilysergol of the formula:



(X)

by irradiation with U. V. rays:

(b) methylating the compound (X) at the indole nitrogen atom by means of a methylating agent to obtain the 1-methyl derivative of the formula:



(XI)

(c) reacting the alcohol (XI) with a molar excess of an organic carboxylic acid of the formula R—COOH, wherein R is defined above, to obtain the compound (I).

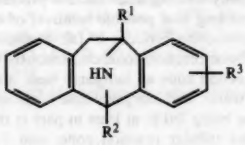
4,232,158

10,11-DIHYDRO-5H-DIBENZO[a,d]CYCLOHEPTEN-5,10-IMINES

Kenneth L. Shepard, Ambler, Pa., and Daniel G. Brenner, Medford, Mass., assignors to Merck & Co., Inc., Rahway, N.J.

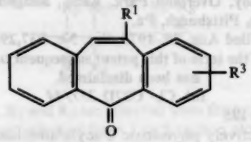
Filed Jun. 4, 1979, Ser. No. 45,494
Int. Cl.³ C07D *487/08*
U.S. Cl. 546—72 **2 Claims**

1. A process for the preparation of a compound of structural formula:



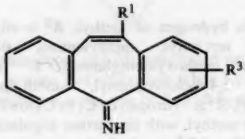
wherein
R^1 and R^2 are independently
(1) C_{1-5} alkyl,
(2) C_{2-5} alkenyl,
(3) phenyl-C_{1-3} alkyl,
(4) C_{3-6} cycloalkyl, or
(5) C_{3-6} cycloalkyl-C_{1-3} alkyl; or
R^1 is hydrogen
R^3 is
(1) hydrogen, or
(2) halogen;
which comprises the following steps, in sequence:

(a) treatment of a compound of formula:



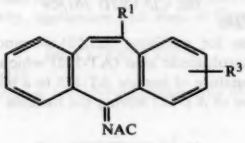
with gaseous ammonia in the presence of titanium tetrachloride;

(b) treatment of the resulting imine of structure:



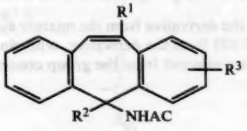
with an acylating agent selected from tosyl chloride, benzenesulfonyl chloride, C_{1-3} alkanoyl chloride, benzoyl chloride and a C_{1-3} lower alkyl chloroformate in the presence of an acid acceptor;

(c) treatment of the resulting acylimine of structure:

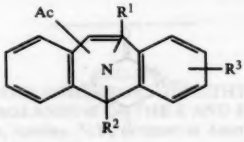


wherein Ac is, tosyl, benzenesulfonyl, C_{1-3} alkanoyl, benzoyl, or C_{1-3} alkoxycarbonyl with an organolithium of formula R^2Li;

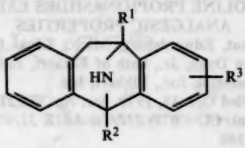
(d) treatment of the resulting acylamide of structure:



with an alkali metal hydroxide to produce the acylimine of structure:



(e) treatment of the acylimine of Step (d) with a strong acid or strong base, or where Ac is an arylsulfonyl group with a strong acid or, sodium bis(2-methoxyethoxy)aluminum hydride to produce the imine of formula:



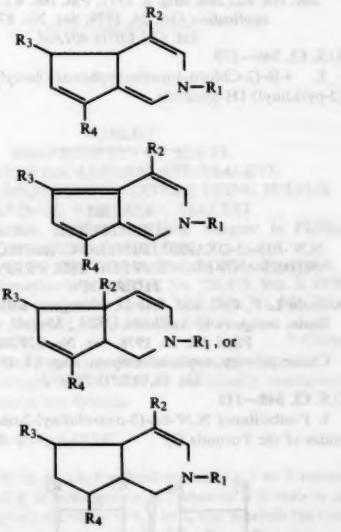
4,232,159

NITROGEN-CONTAINING MONOTERPENE DERIVATIVES

Ryousuke Touyama, Kobe; Hiroyuki Inouye, Kyoto; Tetsuro Shingu, Nishinomiya; Yoshio Takeda, Tokushima; Takeshi Ikumoto, Kobe; Hidetoshi Okuyama, and Osamu Yamamoto, both of Kobe, all of Japan, assignors to Taito Co., Ltd., Tokyo, Japan

Filed Oct. 20, 1978, Ser. No. 953,275
Int. Cl.³ C07D *221/02*
U.S. Cl. 546—112 1 Claim

1. Nitrogen-containing monoterpene derivatives of the general formulae:



wherein:

R_1 represents a lower alkyl group, phenyl, lower alkyl group containing carboxylic acid or its ester,

R_2 represents —COOH or —COOR, wherein R represents a lower alkyl group,

R_3 represents hydrogen or a lower alkyl group, and

R_4 represents a lower alkyl group or $—CH_2OH$.

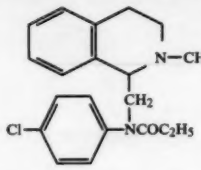
4,232,160

ISOQUINOLINE PROPIONAMIDES EXHIBITING ANALGESIC PROPERTIES

Robert N. Schut, Edwardsburg, Mich.; Edgar O. Snoke, and John W. Van Dyke, Jr., both of Elkhart, Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Filed Oct. 18, 1978, Ser. No. 952,212
Int. Cl.[3] C07D *217/16*; A61K *31/47*
U.S. Cl. 546—146 2 Claims

1. N-[(1,2,3,4-Tetrahydro-2-methyl-1-isoquinolyl)methyl]N-(4-chlorophenyl)propionamide having the structural formula:



2. The compound of claim 1 in the form of its hydrochloric acid addition salt.

4,232,161

4-[6-(2-CHLORO-4-METHOXYPHENOXY)HEXYL]-3,5-DIETHYL-1-(2-PYRIDINYL)-1H-PYRAZOLE

Guy D. Diana, Stephentown, and Philip M. Carabateas, Schodack, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 8,412, Feb. 1, 1979, which is a division of Ser. No. 822,246, Aug. 5, 1977, Pat. No. 4,171,365. This application Oct. 24, 1979, Ser. No. 87,880
Int. Cl.[3] C07D *401/04*
U.S. Cl. 546—279 1 Claim

1. 4-[6-(2-Chloro-4-methoxyphenoxy)hexyl]-3,5-diethyl-1-(2-pyridinyl)-1H-pyrazole.

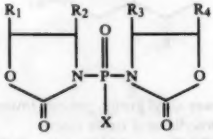
4,232,162

P-SUBSTITUTED N,N'-BIS-(3-OXAZOLIDINYL-2-ONE)PHOSPHORAMIDES AND PROCESS FOR THE PREPARATION THEREOF

Antonio L. P. Coll, and Jose D. Meseguer, both of Barcelona, Spain, assignors to Antibioticos, S.A., Madrid, Spain

Filed Jul. 24, 1978, Ser. No. 927,161
Claims priority, application Spain, Aug. 11, 1977, 461.552
Int. Cl.[3] C07D *263/32*
U.S. Cl. 548—111 3 Claims

1. P-substituted N,N'-bis-(3-oxazolidinyl-2-one) phosphoramides of the Formula (I)



(I)

where R_1, R_2, R_3 and R_4 represent a group selected from among hydrogen, alkyls having from one to four carbon atoms or an aromatic nucleus and X is halogens.

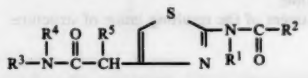
4,232,163

2-ACYLAMINOTHIAZOL-4-YLACETAMIDES AS POST EMERGENT SELECTIVE HERBICIDES

Roger P. Cahoy, Overland Park, Kans., assignor to Gulf Oil Corporation, Pittsburgh, Pa.

Filed Aug. 28, 1978, Ser. No. 937,290
The portion of the term of this patent subsequent to May 1, 1996, has been disclaimed.
Int. Cl.[2] C07D *277/44*
U.S. Cl. 548—195 23 Claims

1. The selectively phytotoxic 2-acylaminothiazol-4-ylacetamide compound having the general structural formula



in which R^1 is hydrogen or methyl, R^2 is ethyl, isopropyl, cyclopropyl, tert.butyl, methylamino, dimethylamino, ethylamino or methoxymethylamino, R^3 is phenyl, 4-chlorophenyl, 3,4-dichlorophenyl, 4-methylphenyl or 4-methoxyphenyl, R^4 is hydrogen or C_1 to C_3 lower alkyl and R^5 is hydrogen or methyl, with the further stipulation that either, but not both R^4 and R^5 may be hydrogen.

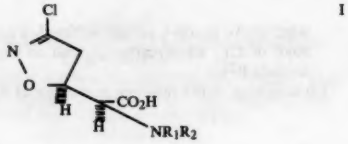
4,232,164

PURIFICATION OF AT-125

David G. Martin, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 906,028, May 15, 1978, abandoned. This application Jun. 23, 1978, Ser. No. 918,569
Int. Cl.[3] C07D *261/04*
U.S. Cl. 548—240 9 Claims

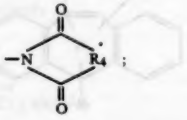
1. A process for purifying (αS,5S)-α-amino-3-chloro-4,5-dihydro-5-isoxazoleacetic acid (AT-125) which comprises (i) converting a mixture of impure AT-125 to a mixture containing a derivative of AT-125 having the formula



I

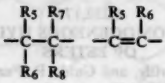
(ii) separating the derivative from the mixture and (iii) regenerating pure AT-125 form the derivative, wherein R_1 and R_2 are different and are selected from the group consisting of hydrogen,

or when taken together with the nitrogen atom form the group

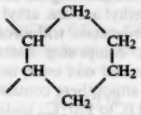


wherein R_3 is alkyl of from 1 to 8 carbon atoms, inclusive, halogenated alkyl of from 1 to 5 carbon atoms, inclusive, and 1 to 3 halogen atoms, inclusive, aryl of from 6 to 20 carbon atoms, inclusive, and aralkyl and substituted aralkyl of from 7

to 20 carbon atoms, inclusive; and R_4 is selected from the group consisting of (a)



where R_5, R_6, R_7 and R_8 are selected from the group consisting of hydrogen and alkyl of from 1 to 5 carbon atoms, inclusive. (b)



(c) orthointerphenylene, and (d) substituted orthointerphenylene, with the proviso that other than when R_1 and R_2 form a ring with the nitrogen atom, one of R_1 and R_2 must always be hydrogen.

4,232,165

2-SUBSTITUTED-1-ALKYL-NITROIMIDAZOLES

Helmut Hagen, Frankenthal, and Rolf-Dieter Kohler, Mannheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

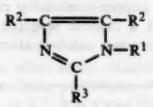
Filed May 11, 1979, Ser. No. 38,175

Claims priority, application Fed. Rep. of Germany, Jun. 22, 1978, 2827351

Int. Cl.³ C07D *233/93*

U.S. Cl. 548—339 **2 Claims**

1. A 2-substituted 1-alkyl-5-nitroimidazole of the formula



I

where R^1 is an alkyl group of 1 to 7 carbon atoms, one R^2 is nitro and the other R^2 is an alkyl group of 1 to 7 carbon atoms or hydrogen, R^3 is

and X is halogen, wherein the R^2 attached to the carbon in the 5 position is nitro and wherein R^1 and R^2 are either unsubstituted or substituted by an alkyl group of 1 to 4 carbon atoms or nitro.

4,232,166

15-DEOXY-16-HYDROXY-17-METHYLENE PROSTAGLANDINS OF THE E AND F SERIES

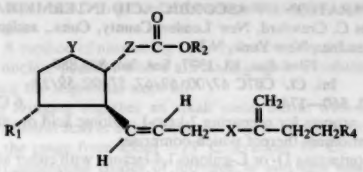
Allan Wissner, Ardsley, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Filed Jun. 7, 1979, Ser. No. 46,723

Int. Cl.³ C07C *177/00*

U.S. Cl. 560—121 **11 Claims**

1. An optically active compound of the formula:



wherein X is:

Y is:

R_1 is hydrogen or hydroxyl;

R_2 is hydrogen or C_1 to C_6 alkyl;

R_3 is hydrogen, methyl or ethyl;

R_4 is hydrogen or C_1 to C_3 alkyl;

Z is selected from the group consisting of a divalent moiety of the formula—$(CH_2)_n$—,—$(CH_2)_mOCH_2$—, and—$(CH_2)_mSCH_2$—, wherein n is 5 to 7, and m is 3 to 5, and the racemic mixture thereof, and when R_1 is hydrogen, the pharmaceutically acceptable salts thereof.

4,232,167

PREPARATION OF ALKYL MERCAPTOCARBOXYLATE/DIALKYL THIODICARBOXYLATE MIXTURE USING SULFUR AND/OR WATER COCATALYST

Rector P. Louthan, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of Ser. No. 737,949, Nov. 2, 1976, abandoned, which is a continuation-in-part of Ser. No. 720,475, Sep. 3, 1976, abandoned. This application Dec. 5, 1978, Ser. No. 966,718

Int. Cl.² C07C *148/00, 149/20*

U.S. Cl. 560—154 **9 Claims**

1. A method of preparing mixed esters comprising:

reacting hydrogen sulfide with an olefinically unsaturated carboxylate of the formula

$$CR_2{=}CR{-}(CR_2{-})_nCO_2R'$$

wherein R' is an alkyl radical containing 1 to 5 carbon atoms and R is hydrogen or R', wherein n is zero or an integer having the value of 1, 2 or 3, and wherein the total number of carbon atoms in all of the R and R' groups is 1 to 15 per molecule,

using an addition catalyst selected from organic and inorganic bases in the presence of a lower alkanol and a cocatalyst consisting essentially of at least one of sulfur and water wherein said sulfur or water is present in amounts within the range of from 0.0001 to 0.2 part by weight per part by weight of unsaturated carboxylate.

4,232,168

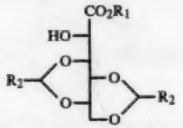
PREPARATION OF ASCORBIC ACID INTERMEDIATES

Thomas C. Crawford, New London County, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Jun. 13, 1977, Ser. No. 805,880
Int. Cl.[2] C07C *67/00, 69/67, 51/00, 59/33*
U.S. Cl. 560—174 6 Claims

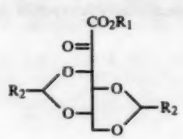
1. A process for preparing 2-keto-L-gulonic acid or ester or D-enantiomers thereof which comprises

(a) contacting D- or L-gulono-1,4-lactone with either at least two equivalents of an aldehyde dialkyl of the formula $R_2CH(OR_1)_2$ or at least two equivalents of an aldehyde of the formula R_2CHO and at least one equivalent of an alcohol of the formula R_1OH in the presence of an acid having a pK_a less than 3 at a temperature of from about 0° to about 70° C. to obtain a compound of the formula



wherein R_1 is alkyl having 1 to 6 carbon atoms and R_2 is alkyl having 1 to 6 carbon atoms, phenyl or monosubstituted or disubstituted phenyl wherein said substituents are alkyl having 1 to 6 carbon atoms, alkoxy having 1 to 6 carbon atoms, chloro, bromo, fluoro or nitro,

(b) oxidizing the product of step (a) with an agent which oxidizes secondary alcohols to ketones to obtain a compound of the formula



and (c) hydrolyzing the compound formed in step (b) under acid conditions at a temperature of from about 35° to 150° C.

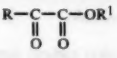
4,232,169

PROCESS FOR PREPARING ALPHA-OXO-ESTERS

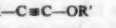
Luciano Re; Alberto Brandt, both of Rome, and Luciano Bassignani, Passo Corese, all of Italy, assignors to Snamprogetti S.p.A., Milan, Italy

Continuation of Ser. No. 831,237, Sep. 7, 1977, abandoned. This application Apr. 24, 1979, Ser. No. 33,014
Claims priority, application Italy, Oct. 6, 1976, 28041 A/76
Int. Cl.[2] C07C *67/00, 69/67, 69/95*
U.S. Cl. 560—174 10 Claims

1. A process for preparing alpha-oxoesters corresponding to the general formula



in which R and R^1, the same or different, may be alkyl, aryl, arylalkyl or cycloalkyl groups, and in addition R may be hydrogen, consisting of reacting an acetylenic compound of the formula



wherein R and R^1 are the same as hereinabove defined, with a mixture of osmium tetroxide and an alkali metal or alkaline earth metal chlorate in the liquid phase at a temperature of about 0° C. to about 100° C. and thereafter recovering the product.

4,232,170

PROCESS FOR HOMOGENEOUS HYDROGENATION OF ESTERS

Roger A. Grey, Denville, and Guido P. Pez, Boonton, both of N.J., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Filed Jan. 31, 1979, Ser. No. 7,876
Int. Cl.[3] C07C *69/675, 31/38, 27/04*
U.S. Cl. 560—179 8 Claims

1. A process for hydrogenating an ester selected from the group consisting of methyl acetate, ethyl acetate, methyl propionate, methyl trifluoroacetate, trifluoroethyl trifluouroacetate and dimethyl oxalate, comprising contacting a solution of hydrogenation catalyst and said ester, neat or in an inert solvent therefor, with an atmosphere containing hydrogen gas, at a temperature of about 0° to 150° C., under a pressure of about 0 to 150 psig (101 to 1135 kPa absolute) of gaseous hydrogen, said catalyst being of the group consisting of potassium tris (triphenylphosphine) ruthenium hydride, potassium triphenylphosphine diphenylphosphide ruthenium hydride, potassium tris (triphenylphosphite) ruthenium hydride, potassium tris triphenylphosphine rhodium hydride, and potassium tris (methyldiphenylphosphine) ruthenium hydride.

4,232,171

PROCESS FOR PRODUCING METHYL FORMATE

Mikio Yoneoka; Minoru Osugi, and Takeo Ikarashi, all of Niigata, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Apr. 10, 1979, Ser. No. 28,681
Claims priority, application Japan, Apr. 21, 1978, 53-47436
Int. Cl.[2] C07C *67/40, 69/06*
U.S. Cl. 560—239 10 Claims

1. In the process for preparing methyl formate by dehydrogenating methanol by contacting methanol with a copper-containing catalyst in the vapor phase, the improvement comprising utilizing as the copper-containing catalyst, a catalyst comprising copper and a cement selected from the group consisting of Portland cement, calcium-aluminate cement and mixtures thereof.

4,232,172

PROCESS FOR THE PREPARATION OF 3,6-DICHLORO-SALICYCLIC

Manfred Becher, Bingen, and Richard Sehring, Ingelheim am Rhein, both of Fed. Rep. of Germany, assignors to Celamerck GmbH & Co. KG, Ingelheim am Rhein, Fed. Rep. of Germany

Filed Feb. 15, 1978, Ser. No. 878,074
Claims priority, application Fed. Rep. of Germany, Mar. 5, 1977, 2709721
Int. Cl.[3] C07C *51/15*
U.S. Cl. 562—423 3 Claims

1. The method of increasing the yield of 3,6-dichloro-salicylic acid in a process comprising carboxylating potassium 2,5-dichloro-phenolate with carbon dioxide in xylene at elevated pressure, which consist of adding an effective yield-increasing amount of finely powdered, anhydrous potassium carbonate to the carboxylation reaction mixture.

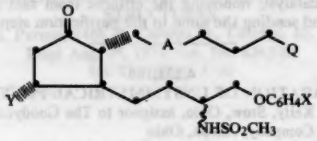
4,232,173

15-SULFONAMIDOPROSTAGLANDIN DERIVATIVES

Thomas K. Schaaf, Old Lyme, and James F. Eggler, Stonington, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Filed Sep. 17, 1979, Ser. No. 76,520
Int. Cl.[3] C07C *177/00*
U.S. Cl. 562—430 7 Claims

1. A 15-sulfonamidoprostaglandin derivative of the formula:



or the pharmacologically acceptable salt thereof, wherein:

Q is $-CO_2H$, $-CO_2R$, tetrazol-5-yl, $-CONHSO_2R$ or $-CONHCOR$;

A is ethylene or cis-vinylene;

Y is H or OH;

X is H, F, Cl, Br, OCH_3, CF_3 or CH_3; and

R is alkyl of 1 to 4 carbons or phenyl.

4,232,174

CATALYST AND DEHYDROGENATION PROCESS

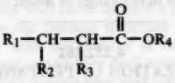
Robert J. Statz, and James K. Doty, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 28, 1979, Ser. No. 24,858

Int. Cl.[2] C07C *57/02, 69/52*

U.S. Cl. 562—599 **4 Claims**

1. In the process for the oxidative dehydrogenation of a saturated compound of the general formula:



wherein each of R_1, R_2, R_3 and R_4 is selected from hydrogen and lower alkyl groups containing 1–4 carbon atoms, by heating the compound in the presence of a catalyst and oxygen to yield the corresponding unsaturated compound, the improvement which comprises heating the compound in the presence of a catalyst of the general formula:

$$Me_aCr_bFePb_cP_dO_e$$

wherein Me is an alkali metal selected from the group consisting of lithium, sodium, potassium, rubidium, and cesium, a is about from 0.01 to 0.3, b is about from 0.05 to 0.4, c is about from 0.6 to 1.0, d is about from 1.0 to 6.0 and e is sufficient to provide oxygen to satisfy the oxidative states of the remaining components.

4,232,175

NITROSATION OF AROMATIC COMPOUNDS

William E. Smith, and Thomas W. McGee, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 8, 1977, Ser. No. 858,508

Int. Cl.[3] C07C *79/24*

U.S. Cl. 568—706 **14 Claims**

1. A method of preparing a nitrosating agent in an aqueous solution comprising the sequential steps of:

(a) bringing together an alkali metal nitrite with a strong mineral acid in a first aqueous medium at a temperature in the range from about −15° C. to about 35° C.;

(b) generating oxides of nitrogen in said first medium by maintaining or elevating the temperature of the medium to a range from about 15° C. to about 35° C. during or following the bringing together of said nitrite and acid, said oxides evolving into the atmosphere above the medium; and

(c) removing said evolved oxides of nitrogen to a second acidic, aqueous solution, comprising an acid or mixture of acids selected from the group consisting of nitric acid, hydrochloric acid, sulfuric acid and acetic acid, maintained at a temperature in the range from about −15° C. to about 10° C. to produce the nitrosating agent in said solution.

8. A method of nitrosating a phenylic compound nitrosatable in a nuclear position with a nitrosating agent in solution comprising the sequential steps of:

(a) bringing together an alkali metal nitrite with a strong mineral acid in a first aqueous medium at a temperature in the range from about −15° C. to about 35° C.;

(b) generating oxides of nitrogen in said first medium by maintaining or elevating the temperature of the medium to a range from about 15° C. to about 35° C., said oxides evolving into the atmosphere above the medium;

(c) removing said evolved oxides of nitrogen into a second acidic, aqueous solution maintained at a temperature in the range from about −15° C. to about 10° C.; and

(d) bringing together said nitrosatable phenylic compound with said evolved oxides of nitrogen in the seond acidic, aqueous solution, comprising an acid or mixture of acids selected from the group consisting of nitric acid, hydrochloric acid, sulfuric acid and acetic acid, at a temperature in the range of from about −20° C. to about 25° C.

4,232,176

METHOD OF REMOVING ALUMINUM-CONTAINING CATALYST FROM PHENOL ALKYLATION PRODUCTS

Engel R. Adigamov, Revoljutsionnaya ulitsa, 11, kv. 31, Bashkirskaya ASSR, Sterlitamak; Yakov A. Gurvich, Sretensky bulvar, 6, kv. 61, Moscow; Alexandr G. Liakumovich, ulitsa Galeeva, 10, kv. 8, Kazan; Igor J. Logutov, ulitsa Druzhby, 47, kv. 50, Bashkirskaya ASSR, Sterlitamak; Jury I. Michurov, prospekt Lenina, 13, kv. 4, Bashkirskaya ASSR, Sterlitamak; Alexei S. Polenov, prospekt Oktyabrya, 15, kv. 16, Bashkirskaya ASSR, Sterlitamak, and Vladimir A. Yanshevsky, Kommunisticheskaya ulitsa, 42, kv. 12, Novokuibyshevsk, all of U.S.S.R.

Filed Jun. 14, 1976, Ser. No. 695,753

Int. Cl.[3] C07C *37/70, 37/84*

U.S. Cl. 568—756 **3 Claims**

1. A method of removing aluminum-containing catalyst from phenol alkylation products, which consists essentially of treating said alkylation products with water at a temperature of 185°–200° C. till crystalline meta-aluminate is formed, and separating the resultant meta-aluminate.

4,232,177

CATALYTIC DISTILLATION PROCESS

Lawrence A. Smith, Jr., Houston, Tex., assignor to Chemical Research & Licensing Company, Houston, Tex.

Filed Feb. 21, 1979, Ser. No. 13,559

Int. Cl.[3] C07C *1/20, 11/09*; B01D *3/32*

U.S. Cl. 585—324 **3 Claims**

1. A method of producing isobutene comprising:

(a) feeding methyl tertiary butyl ether to a distillation column reactor into a feed zone said feed zone being at the upper end of a fixed bed acid cation exchange resin packing,

(b) concurrently in said distillation column reactor:

(1) contacting said methyl tertiary butyl ether with a fixed bed cation exchange resin packing in a distillation reaction zone thereby catalytically dissociating methyl tertiary butyl ether into methanol and isobutene,

(2) fractionating the resulting mixture in said fixed bed ion exchange resin packing,

(c) withdrawing isobutene from the distillation column reactor at a point above said feed zone, and

(d) withdrawing methanol from the distillation column reactor at a point below said feed zone.

4,232,178

PROCESS FOR THE PREPARATION OF AN AROMATIC HYDROCARBON MIXTURE USING IRON CRYSTALLINE SILICATES

Lambert Schaper, and Swan T. Sie, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed May 29, 1979, Ser. No. 43,194

Claims priority, application Netherlands, May 30, 1978, 7805840

Int. Cl.³ C07C *15/00*

U.S. Cl. 585—408 **7 Claims**

1. A process for the preparation of an aromatic hydrocarbon mixture from a mixture of aliphatic compounds which comprises contacting in a reaction zone as feed, a mixture of aliphatic oxygen-containing hydrocarbons having the general formula $C_nH_mO_p$, which mixture consists of a predominant molar amount of one or more compounds selected from monovalent alcohols, ethers, ketones, and aldehydes with at least three carbon atoms in the molecule for which $m-2p/n$ is greater than 1 and the rest of the feed comprises a minor molar amount of one or more compounds selected from carboxylic acids, polyvalent alcohols, carbohydrates, carboxylic anhydrides, and aldehydes with less than three carbon atoms in the molecule for which $m-2p/n$ is at most 1 at an elevated temperature of from 250° to 650° C., with an aromatization catalyst comprising a crystalline silicate, which

(a) is thermally stable to temperatures above 600° C.,

(b) after dehydration at 400° C. in vacuum, is capable of adsorbing more than 3%w water at 25° C. and saturated water vapour pressure, and

(c) in dehydrated form, has the following overall composition expressed in moles of the oxides:

$$(1.0\pm0.3)(R)_{2/n}O.[a\ Fe_2O_3.b.Al_2O_3.c\ Ga_2O_3].\ y(d\ SiO_2.e\ GeO_2),$$

where:

R=one or more mono or bivalent cations,

$a \geqq 0.5$

$b \geqq 0$,

$c \geqq 0$,

$a+b+c=1$,

$y \geqq 10$,

$d \geqq 0.1$,

$e \geqq 0$,

$d+e=1$,

n=the valency of R, and

withdrawing a hydrocarbon product from said reaction zone which product can be separated into a mixture of aliphatic hydrocarbons with one to four carbon atoms in the molecule and a hydrocarbon mixture of five or more carbon atoms in the molecule containing aromatic hydrocarbons.

4,232,179

PROCESS FOR PREPARING ETHENE

Helcio V Valladares Barrocas, Niteroi; Joao B. de Castro M. da Silva, and Ruy Coutinho de Assis, both of Rio de Janeiro, all of Brazil, assignors to Petroleo Brasileiro S.A.-Petrobras, Rio de Janeiro, Brazil

Filed Aug. 9, 1978, Ser. No. 932,283

Claims priority, application Brazil, Aug. 9, 1977, 7705256[U]

Int. Cl.³ C07C *1/24*

U.S. Cl. 585—640 **12 Claims**

1. Process for preparing ethene by dehydrating ethyl alcohol in the presence of catalyst, characterized in that ethyl alcohol is heated by indirect heat exchange, up to a temperature in the range from 180°–600° C., introducing thus heated ethyl alcohol into one or more adiabatic reactors containing in its interior a catalyst fixed bed, said adiabatic reactor being maintained in a pressure range between 0.2 and 20 kg/cm² absolute, and said fixed catalyst bed being maintained at a temperature comprised within the range from 600° C. on the top to 180° C. in the bottom, by means of a sensible heat carrying stream heated up to a temperature up to 800° C., the weight ratio between the sensible heat carrying fluid stream and the stream of ethyl alcohol varies within a 0.2:1 to 20:1 range, and the ratio between the amounts of ethyl alcohol and the catalyst is comprised within a range from 10 to 0.01 g/h of ethyl alcohol per gram of catalyst; removing the effluent from said adiabatic reactor and sending the same to the purification step.

4,232,180

PREPARATION OF UNSYMMETRICAL POLYENES

Walter J. Kelly, Stow, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 564,003, Mar. 31, 1975, abandoned. This application Nov. 10, 1976, Ser. No. 740,649

Int. Cl.³ C07C *6/06*

U.S. Cl. 585—645 **2 Claims**

1. A method of preparing a polyene product comprised of a symmetrical/unsymmetrical/symmetrical polyene mixture and containing at least 75 weight percent unsymmetrical polyene with a single terminal double bond through a cross-metathesis reaction which comprises contacting a mixture of 1-pentene and cyclopentene, at a temperature in the range of about −5° C. to about 40° C. with a cross-metathesis catalyst which comprises (A) at least one compound selected from diethylaluminum chloride, dipropyl aluminum chloride, ethylaluminum dichloride, propylene aluminum dichloride and tetrabutyltin; (B) at least one metal derivative selected from tungsten hexachloride and tungsten hexafluoride and (C) at least one alcohol selected from 2-chloroethanol and 2,2,2,-trichloroethanol; where the molar ratio of A/B catalyst components is in the range of about 0.5/1 to about 8/1 and the molar ratio of B/C catalyst components is in the range of about 0.5/1 to about 5/1 and where the molar ratio of the monomers 1-pentene/cyclopentene is in the range of about 0.5/1 to about 20/1.

4,232,181

HYDROISOMERIZATION OF PENTANE UTILIZING PD EXCHANGED MORDENITE

Joseph R. Kiovsky, Kent, and William J. Goyette, Brimfield, both of Ohio, assignors to Norton Company, Worcester, Mass.

Division of Ser. No. 913,812, Jun. 8, 1978, which is a continuation of Ser. No. 825,979, Aug. 19, 1977, abandoned, which is a continuation of Ser. No. 421,505, Dec. 3, 1973, abandoned. This application Jun. 28, 1979, Ser. No. 53,078

Int. Cl.² C07C *5/30*

U.S. Cl. 585—739 **1 Claim**

1. A method of isomerizing comprising passing a mixture of hydrogen and pentane over Pd exchanged mordenite at a temperature between 450° F. and 550° F., characterized in that said mordenite contain less than 0.2% by weight exchanged sodium, has a silica to alumina ratio of between 10 and 17, contains from 0.38 to 0.8 milliequivalents per gram of acid sites stronger than 48% aqueous sulfuric acid.

4,232,182

PROCESS FOR PURIFYING ISOPRENE

Alexandr G. Liakumovich, prospekt Lenina, 23, Kv. 4; Boris I. Pantukh, ulitsa Khudaiberdine, 162, kv. 89, both of Sterlitamak, and Tatyana M. Lesteva, 4 Sovetskaya ulitsa, 3a, kv. 12, Leningrad, all of U.S.S.R.

Continuation of Ser. No. 764,645, Feb. 1, 1977, abandoned, which is a continuation of Ser. No. 682,105, Apr. 30, 1976, abandoned, which is a continuation of Ser. No. 570,994, Apr. 22, 1975, abandoned. This application Nov. 21, 1977, Ser. No. 853,816

Int. Cl.³ C07C *7/04, 7/12, 11/18*

U.S. Cl. 585—820 **6 Claims**

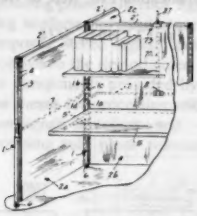
1. A process for purifying isoprene produced by catalytic decomposition of dimethyldioxane from carbonyl compounds and cyclopentadiene which consists of the steps of passing isoprene at a temperature of from 40° to 70° C. through a bed of a solid product selected from the group consisting of an anion exchange resin and alkali, and subjecting said isoprene to close fractionation on at least 50 theoretical plates and at a reflux ratio of at least 3 recycling 20 to 80 wt.% of said purified isoprene following close fractionation for admixture with the starting isoprene to be purified.

4,232,183

ELECTRICAL CONNECTION SYSTEM FOR PANEL STRUCTURES

Nelson H. Person, 1465 W. Catalpa St., Chicago, Ill. 60640

Filed Aug. 29, 1977, Ser. No. 828,918
Int. Cl.³ H02G *3/00*
U.S. Cl. 174—48 **43 Claims**



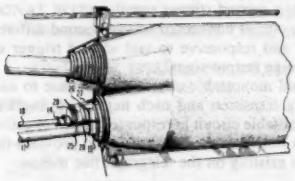
1. In a free standing, space dividing partition structure accommodating electrical conductors and employing a plurality of wall panels and cooperable elongated hollow supporting columns therefor, in which at least a pair of adjacent panels are supported, by a common column structure, at their vertical end edges by cooperable connecting means on said panels and said common hollow column structure, the combination of the hollow column structure having a plurality of access openings in the side walls thereof through which electrical conductors may extend from one wall panel of such a pair into the column structure and from the column structure into the other wall panel of such pair with the interior of the column structure forming a connecting conduit for such conductors between the respective wall panels of such pair, said column structure being constructed in the form of a plurality of aligned sections, at least one of which is rotatably adjustable relative to another about the column axis, said one section having at least one of said conductor access openings therein, and means for retaining such sections in assembled relation.

4,232,184

CABLE ADAPTER FOR CONVERTING A CABLE CLOSURE NOZZLE TO A TWO CABLE ENTRANCE

Carl W. Faust, Dover, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 14, 1979, Ser. No. 20,533
Int. Cl.³ H02G *15/013, 15/113*
U.S. Cl. 174—92 **11 Claims**



1. A cable adapter for converting a one cable closure nozzle to a selectable diameter two cable entrance comprising:

a unitary molded member of electrically insulative material having first and second adjacent pluralities of concentric openings of various diameters therein, said openings extending along the length of said unitary member in increasing order of diameter, said unitary member adapted for engagement with said cable closure nozzle at the largest diameter openings so as to facilitate a sealed entrance of first and second axially aligned cables into said cable closure; and

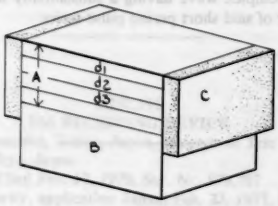
means, extending along the length of said member at a plurality of discrete longitudinal positions and about a plurality of discrete spaced-apart points on the circumferential periphery of said member, for stiffening said member so that given first and second concentric openings in said first and second pluralities of said openings remain in firm contact with said first and second axially aligned cables, respectively, upon engagement of said unitary member with said cables.

4,232,185

ELECTRICAL INSULATOR WITH SEMICONDUCTIVE GLAZE

Noboru Higuchi, Nagoya; Takayuki Ogasawara, Konan, and Shoji Seike, Nagoya, all of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Apr. 28, 1978, Ser. No. 900,935
Claims priority, application United Kingdom, May 2, 1977, 18383/77
Int. Cl.³ H01B *3/10, 3/12*
U.S. Cl. 174—140 C **2 Claims**



1. An insulator comprising an insulator body and a glaze coating on said body, said glaze coating consisting of a tin oxide type semiconductive glaze including tin oxide and antimony oxide, wherein, in order to render the current distribution more uniform within the thickness of the glaze coating, the ratio of maximum to minimum volume resistivity of incremental parts of the glaze in any portion of the glaze coating is not more than 30, said portion having a thickness of at least 100 microns in the direction from the glaze surface inwardly towards the insulator body.

4,232,186

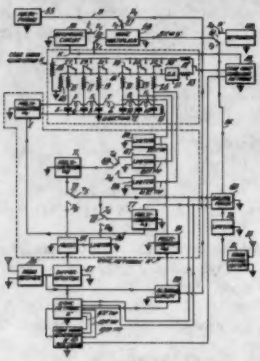
METHOD OF AND MEANS FOR GENERATING COMPLEX ELECTRICAL CODING WAVES FOR SECRET COMMUNICATIONS

Alda V. Bedford, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Jul. 22, 1944, Ser. No. 546,189
Int. Cl.³ H04K *9/04*
U.S. Cl. 178—22 **23 Claims**

10. Apparatus for generating a complex wave comprising means for generating a plurality of different concurrent short period series of pulses, a plurality of electrical networks, means for applying a different one of said series of pulses to each of said electrical networks, means for deriving a plurality of differently delayed unmodulated pulse signals from each of said networks in response to said applied series of pulses, means for combining said derived signals from predetermined ones of said networks, and means for selecting in a predetermined manner said delayed signal components, and means for deriv-

ing from said selected signal components a complex wave having a period longer than either of said selected pulse periods, said complex wave having a substantially longer period than either of said short period pulse series.



4,232,187

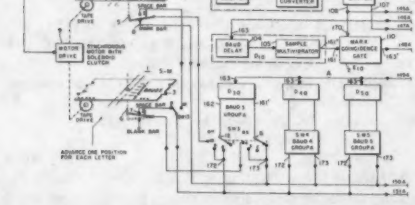
TELETYPE CHARACTER MODIFICATION UNIT

Gerald Weiss, New York; Gerson Scharf, Bronx; Anthony A. Guido, Yonkers, and Benjamin Lazardwitz, Bronx, all of N.Y., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 5, 1962, Ser. No. 171,319

Int. Cl.³ H04K *9/00*

U.S. Cl. 178—22 **13 Claims**



3. A teletype modification unit comprising: a signal shaper having input means for receiving mark-space teletype pulses; a synchronization circuit coupled to said signal shaper; a plurality of delay means coupled to said synchronization circuit; a space coincidence circuit; a mark coincidence circuit; means to selectively couple said plurality of delay means to said space coincidence circuit, and means to selectively couple said plurality of delay means to said mark coincidence circuit.

4,232,188

CIRCUIT ARRANGEMENT FOR RECEIVING SIMPLEX AND DUPLEX CURRENT TELEGRAPH CHARACTERS

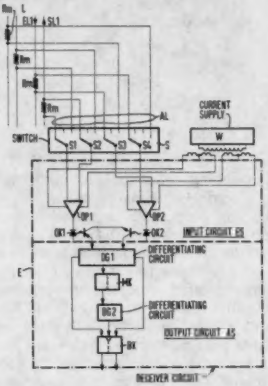
Dieter Giersberg, Feldkirchen-Westerham, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Feb. 15, 1979, Ser. No. 12,349

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1978, 2806884

Int. Cl.³ H04L *5/14*

U.S. Cl. 370—24 **11 Claims**



1. A circuit arrangement for receiving single-current and double-current telegraph characters, comprising:

telegraph line means for receiving telegraphic pulses;

resistance means in said telegraph line means for carrying line current;

an input circuit including amplifier means connected to evaluate the voltage drop across said resistance means; and

an output circuit connected to said input circuit, including

a first differentiating circuit operable in response to the output of said amplifier means to provide a first trigger signal,

a monostable circuit connected to said first differentiating circuit and triggered thereby to provide a pulse of a predetermined length;

a second differentiating circuit connected to said monostable circuit and operable to differentiate said pulse and provide a second trigger signal, and

a bistable circuit connected to said second differentiating circuit and responsive to said second trigger signal to provide an output signal,

whereby said monostable circuit, in response to each positive-going transition and each negative-going transition, and said bistable circuit in response to each negative-going transition from said monostable circuit provides the signal condition existing on the telegraph line means.

4,232,189

AM STEREO RECEIVERS

Clifford D. Leitch, Quincy, Ill., assignor to Harris Corporation, Cleveland, Ohio

Filed Aug. 31, 1977, Ser. No. 829,518

Int. Cl.³ H04R *5/04*

U.S. Cl. 179—1 G **9 Claims**

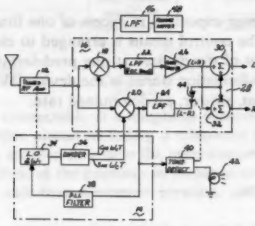
1. A radio receiver for receiving and directly demodulating a composite stereo signal including two program signals which have been modulated onto a carrier signal in accordance with pure or modified quadrature modulation techniques comprising:

means for receiving said composite stereo signal and for

directly supplying said signal to a stereo demodulator without converting said signal to an intermediate frequency;

stereo demodulator means responsive to said composite stereo signal for demodulating said signal to recover said program signals and including first and second detector means, each responsive to said composite stereo signal and to a corresponding phase reference signal for respectively demodulating in-phase and quadrature-phase components of said composite stereo signal, and signal processing means responsive to the demodulated in-phase and quadrature-phase components provided by said first and second detector means for processing said signals to recover said program signals therefrom; and

means for providing said phase reference signals and for



synchronizing said signals in frequency with said composite stereo signal, with the phases of said reference signals being selected so that said in-phase and quadrature-phase components of said composite stereo signal are demodulated by said detector means, said reference signal providing means including oscillator means for providing said phase reference signals and responsive to a control signal for varying the frequency of said phase reference signals, and means for filtering the demodulated quadrature-phase component so as to derive a control signal, said control signal being provided to said oscillator means for controlling the frequency of oscillation thereof,

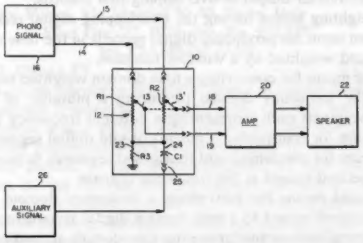
whereby said program signals are recovered without use of an intermediate frequency stage so that degradation of stereo separation due to the presence of an intermediate frequency stage is avoided.

4,232,190

APPARATUS FOR COMBINING PHONOGRAPH SIGNAL WITH AUXILIARY AUDIO SIGNAL

Michael N. Laiacona, 213 Shipbuilders Creek, Webster, N.Y. 14580

Filed Feb. 6, 1978, Ser. No. 875,238
Int. Cl.³ H04R 5/00
U.S. Cl. 179—1 B **5 Claims**



1. Audio signal apparatus for combining an auxiliary audio signal with each of a plurality of audio signals emanating from a primary audio signal source such as a phonograph or the like, comprising

a primary signal source for producing a plurality of first audio signals,

an auxiliary device for producing independently of said primary source a second audio signal from a source having a relatively high impedance compared to that of said primary signal source,

means for combining said second signal with each of said first signals to produce a plurality of composite audio signals each comprising components of said first and second signals, and

an amplifier for amplifying said composite signals and for applying the amplified signals to one or more speakers,

said combining means including means for attenuating the low frequency portion of said second signal prior to combining said first signals with said second signal, thereby to prevent distortion of the amplified composite signals, and

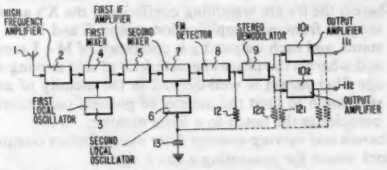
said combining means further including means for selectively adjusting the amplitude of said first and second signals, respectively, whereby one of the signal components of each of said composite signals may be amplified greater than the other.

4,232,191

FM RECEIVING DEVICE

Takeshi Matsuzuka, Tokyo, Japan, assignor to Trio Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 17, 1978, Ser. No. 878,797
Claims priority, application Japan, Feb. 23, 1977, 52-21222
Int. Cl.² H04H 5/00; H03D 7/16
U.S. Cl. 179—1 GD **11 Claims**



1. A double super heterodyne, stereo FM receiver comprising

a first local oscillator;

a first mixer responsive to an FM stereo input signal and the output from said first local oscillator for deriving a first intermediate frequency signal;

a second local oscillator;

a second mixer responsive to said first intermediate frequency signal and the output from said second local oscillator for deriving a second intermediate frequency signal;

an FM detector for demodulating the second intermediate frequency signal;

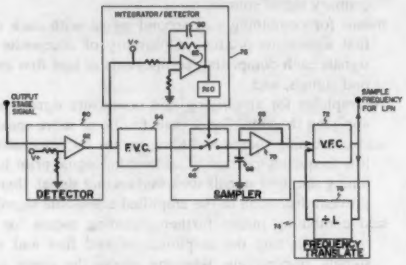
a stereo demodulator DC coupled to said FM detector and responsive to the demodulated output signal from said FM detector for deriving left and right audio signals, said stereo demodulator being capable of passing a DC component from the FM detector: and

means for controlling the frequency of said second local oscillator in response to said DC component taken from a point after said stereo demodulator so that the DC component is reduced to substantially zero to thereby lessen shock noise during tuning of the receiver.

4,232,192
MOVING-AVERAGE NOTCH FILTER

Aloysius A. Beex, Hopkins, Minn., assignor to Starkey Labs, Inc., Minneapolis, Minn.

Filed May 1, 1978, Ser. No. 901,771
Int. Cl.[2] H04R 3/02
U.S. Cl. 179—1 FS **19 Claims**



1. A sound amplification system comprising:
first transducer means for providing a signal in accordance with sound-wave excitations in the environment;
amplification means for amplifying said signal;
filter means having a notch therein corresponding to an oscillation frequency of said signal which is to be suppressed; and
second transducer means for converting the output from the filter means into excitations detectable by a listener,
wherein the improvement comprises said filter means being a moving-average filter means having a frequency response with at least one notch therein, the output Y_K of said moving-average filter being derived in accordance with the system equation

$$Y_K = \sum_{i=0}^{M} b_i X_{K-i-S}$$

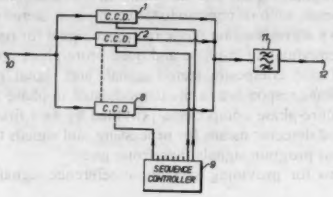
wherein the b's are weighting coefficients, the X's are input samples from said amplification means, S and K are constants, and each output Y_K is composed of M+1 samples, and wherein the phase characteristic of said moving-average filter means is well-defined in the vicinity of and at said notch to limit the number of possible oscillation frequencies at the notch to a finite number,
wherein said moving-average filter means further comprises:
clock means for generating a clock signal;
memory means for sampling the output from said amplification means in accordance with said clock signal and for storing and shifting at least M+1 samples in accordance with said clock signal; and
automatic clock control means for controlling the frequency of said clock signal in accordance with the output from said moving-average filter means to thereby control the location of said at least one notch in the frequency response of said moving-average filter means.

4,232,193
MESSAGE SIGNAL SCRAMBLING APPARATUS

Roger E. J. Gerard, Chelmsford, England, assignor to The Marconi Company Limited, Chelmsford, England

Filed May 3, 1978, Ser. No. 902,570
Claims priority, application United Kingdom, May 12, 1977, 20074/77
Int. Cl.[3] H04K 1/06
U.S. Cl. 179—1.5 R **5 Claims**

1. A message signal scrambling apparatus including a plurality of charge coupled devices connected in parallel each for storing a signal of at least one time slot duration, input and output terminal means for applying signals to and taking signals from the parallel combination respectively, and control means arranged to clock signals, applied in operation to the input terminal means, into and out of each one of the charge coupled devices in a predetermined coded manner so that the applied signal is scrambled in time, the charge coupled devices

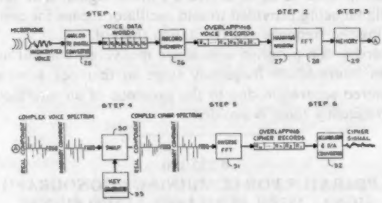


having storage capacities in excess of one time slot so that in operation the control means is arranged to clock information into and out of the devices at one predetermined rate and to clock the information stored in the devices along said devices at a different, slower, predetermined rate.

4,232,194
VOICE ENCRYPTION SYSTEM

Robert H. Adams, Sun Valley, Calif., assignor to Ocean Technology, Inc., Burbank, Calif.

Filed Mar. 16, 1979, Ser. No. 21,255
Int. Cl.[3] H04K 1/06
U.S. Cl. 179—1.5 R **17 Claims**

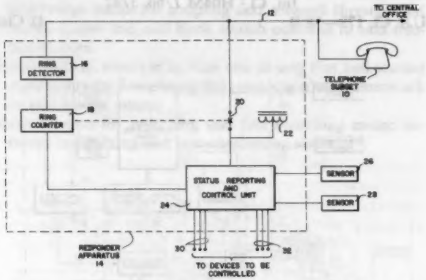


1. In an encoder or decoder for a voice encryption system, the combination of:
an analog-to-digital converter for converting a first analog signal to a sequence of digital words;
storage means for storing words from said analog-to-digital converter output in overlapping first records;
weighting means having the overlapping digital records as an input for producing digital records in the time domain and weighted by a window function;
first means for converting a time domain weighted record to the frequency domain producing a plurality of digital segments each representing a different frequency band;
means for transposing segments of said digital segments;
means for combining said transposed segments to produce a second record in the frequency domain;
second means for converting a frequency domain digital second record to a time domain digital second record;
accumulator means for storing time domain second records; and
a digital-to-analog converter for converting said time domain second records to a second analog signal.

4,232,195
TELEPHONE RESPONDER APPARATUS

Everhard H. B. Bartelink, 15 Ridge Rd., Concord, N.H. 03301

Filed Jul. 19, 1978, Ser. No. 926,104
Int. Cl.[3] H04M *3/38*
U.S. Cl. 179—2 A 13 Claims



1. Apparatus connectable at a telephone subscriber's premises to a subscriber circuit including a telephone subset, said apparatus being adapted to enable the transmission of a status report of conditions at the premises in response to the receipt of a telephone call from a remote location, said apparatus comprising:

A. means for detecting ring signals received on the subscriber circuit during an incoming telephone call;

B. means coupled to said ring signal detecting means for counting the number of incoming ring signals received on the subscriber circuit, said counting means being responsive to the receipt of a predetermined number n of incoming ring signals, where n is greater than one, for establishing an off-hook condition on the subscriber circuit;

C. status reporting means responsive to the establishment of the off-hook condition on the subscriber circuit by said counting means for generating and transmitting a reporting signal over the subscriber circuit during the off-hook condition, said status reporting signal being recognizable by a calling party and being indicative of conditions at the premises;

D. means responsive to the transmission of the status reporting signal by said status reporting means for returning the subscriber circuit to an on-hook condition; and

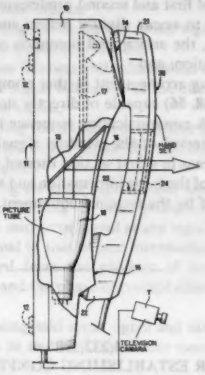
E. means for enabling the performance of a control function at the premises in response to the receipt of a second telephone call from a remote location subsequent to the aforementioned first telephone call, said control function means including electrical switching means operable in response to the receipt by said counting means of a predetermined number m of incoming ring signals during the second telephone call.

4,232,196
VIDEO TELEPHONE APPARATUS

Frederico Filippi, Via Mazzini N. 40, Turin, Italy

Filed Dec. 27, 1978, Ser. No. 973,627
Int. Cl.[3] H04M *11/08*
U.S. Cl. 179—2 TV 7 Claims

1. A video telephone apparatus useful at indoor positions, the apparatus comprising: a casing having a frontal wall and a longitudinal axis; a picture tube having an axis, said picture tube being positioned within said casing with its said axis substantially parallel to said longitudinal axis of said casing; a hand-set having an axis and including a transmitter; and a receiver with a handle portion therebetween; an aperture in said handle portion; seating means on said casing for allowing said hand-set to be removably positioned therein when not held by a user; a window in said frontal wall of said casing, said window having a contour substantially identical to that of said aperture in said handle portion and being visible through said aperture when said hand-set is positioned in said seating means; and image reflecting means positioned in said casing between

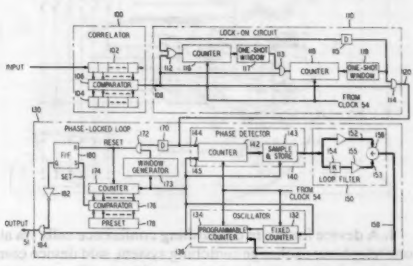


said picture tube and said window for reflecting images from said picture tube to make them viewable via said window.

4,232,197
PROCESSOR FOR A TDMA BURST MODEM

Anthony Acampora, Freehold, and Rollin E. Langseth, Colts Neck, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 25, 1978, Ser. No. 936,714
Int. Cl.[2] H04J *3/06*
U.S. Cl. 370—97 11 Claims



1. A processing arrangement for interfacing a TDMA burst modem and slow speed terminal processing equipment in a communication system which interchanges bursts of information in assigned time slots of a repetitive TDMA communication sequence, each TDMA communication sequence including a sequence marker signal disposed at a predetermined location therein for reception by the burst modem, the processing arrangement comprising:

first means (50) capable of both detecting the sequence marker signals in the repetitive TDMA communication sequence and generating an output signal in response to the detection thereof;

second means (52, 62) capable of generating a window signal for each burst of information within the TDMA communication sequence desired to be processed by the slow speed terminal processing equipment in response to an output signal from the first means

CHARACTERIZED IN THAT

the first means comprises circuitry which also generates an output signal corresponding in time to the normally received sequence marker signals;

the second means generates a window signal which starts at a first predetermined interval and ends at a second predetermined interval from each output signal from the first means, said first and second predetermined interval being scheduled to occur slightly before and slightly after, respectively, the anticipated reception of the desired burst of information; and

the processing arrangement further comprises

a memory (**48**, **56**) capable of directly storing the portion of the TDMA communication sequence being received during the interval of the window signal generated by the second means in a first section thereof (**48**) for subsequent detection of the burst information and slow speed processing thereof by the terminal equipment.

4,232,198

DEVICE FOR ESTABLISHING CONFERENCE CALLS VIA AT LEAST ONE TELEPHONE EXCHANGE SWITCHING SYSTEM

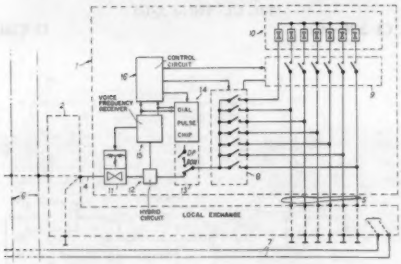
Bloomfield J. Warman, 67, King Harold's Way, Bexleyheath, Kent, England

Filed Oct. 3, 1978, Ser. No. 948,271

Claims priority, application United Kingdom, Oct. 6, 1977, 41713/77

Int. Cl.[3] **H04M** *3/56*

U.S. Cl. 179—18 BC **10 Claims**



1. A device for use in establishing conference calls via at least one telephone exchange switching system, said device comprising (a) an inlet arranged to be accessed by a calling party via said telephone exchange switching system, (b) a plurality of outlets arranged to provide access to respective lines of said telephone exchange system for the setting of outgoing telephone calls, (c) a conference bridge for providing a two way speech path between any two or more ports thereof, (d) first switching means for selectively connecting said inlet of said conference device either to one of said ports of said conference bridge or to any one of said plurality of outlets, (e) second switching means for connecting any one or more of said outlets of the device to ports of said conference bridge, and (f) control means connected to said inlet and responsive to predetermined incoming command signals received at said inlet for actuation of said first and second switching means upon a calling party having gained access to said inlet by actuating said first switching means to obtain a direct connection to selected outlets in order, by transmission of dialling or other call setting signals as required by said exchange, to establish outgoing telephone calls to called parties and subsequently by actuating said second switching means to connect the called parties to said conference bridge and by actuating said first switching means to connect the calling party to said conference bridge.

4,232,199

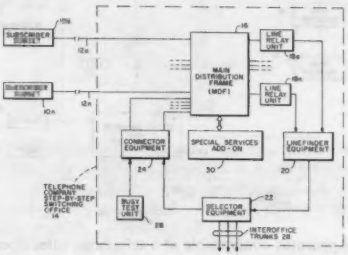
SPECIAL SERVICES ADD-ON FOR DIAL PULSE ACTIVATED TELEPHONE SWITCHING OFFICE

John T. Boatwright, Concord; David G. Prince, New Durham; William F. Haskett, and Helmut Koch, both of Concord, all of N.H., assignors to Summa Four, Inc., Concord, N.H.

Filed Oct. 18, 1978, Ser. No. 952,487

Int. Cl.[2] **H04M** *1/66, 3/42*

U.S. Cl. 179—18 B **41 Claims**



1. In a telephone system of the type including a plurality of subscriber subsets connected by a corresponding plurality of subscriber lines to a telephone switching office that includes dial pulse actuated switching equipment, apparatus connectible within the office for augmenting the switching capabilities thereof by enabling the provision of a plurality of special services to subscribers not otherwise providable by the office itself, said apparatus comprising:

A. line circuit means associated with each subscriber line to receive a special service, each of said line circuit means including

i. means for sensing circuit status of the subscriber line including signals transmitted from the subscriber subset over the subscriber line to the office, and

ii. switch means actuated to modify the connection between the subscriber line and the office switching equipment;

B. buffer storage means for storing subscriber line circuit status and signal information sensed by said line circuit sensing means;

C. a first bidirectional data bus for transferring information between said buffer storage means and each of said line circuit means;

D. memory means for storing subscriber identification and class of service information;

E. processor means responsive to subscriber identification and class of service information stored in said memory means and to subscriber line circuit status and signal information stored in said buffer storage means for recognizing that a special service is to be provided on one of the subscriber lines and for controlling said switch means in the appropriate one of said line circuit means so as to effect the connection modification necessary to provide the special service on that line; and

F. a second bidirectional data bus for transferring information between said processor means, said memory means and said buffer storage means, said second bus being isolated from said first bus by said buffer storage means.

4,232,200

DIALING SYSTEM

Alfred M. Hestad; Jan Synek, and Harold O. Hansen, all of Chicago, Ill., assignors to United Networks, Inc., Chicago, Ill.

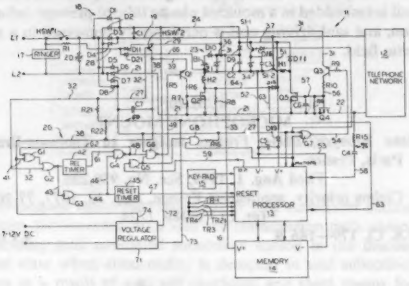
Filed Oct. 23, 1978, Ser. No. 953,885

Int. Cl.[2] **H04M** *1/274, 19/08*

U.S. Cl. 179—90 K **14 Claims**

1. An improved telephone dialing system comprising a telephone substation;

said substation comprising:
a network;
bridge means connecting said network to the telephone lines;
hook switch contacts between said bridge means and said telephone lines;
at least a first and a second conductor means extending from said bridge means for coupling said network through said bridge means and said hook switch contacts to said telephone lines;
first switching means in at least one of said first and second conductors for completing the connection of said network to said bridge means;
control means for switching said first switching means between conducting and non-conducting states;



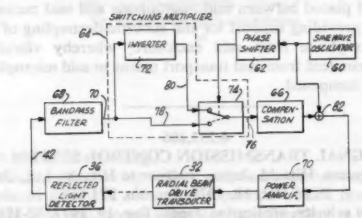
said control means operated responsive to an open loop condition;
said dial signal generating means including memory means for storing telephone numbers therein;
first isolating circuit means to couple said memory means to said telephone lines for powering said memory means when said telephone substation is in the on-hook condition;
internal power supply means for powering said dial signal generating means in the off-hook condition; and
said bridge means including second isolating circuit means for connecting said internal power supply means to receive power from said telephone lines.

4,232,201

DITHERED CENTER TRACKING SYSTEM

Lawrence S. Canino, Torrance, Calif., assignor to MCA Discovision, Inc., Universal City, Calif.

Filed Nov. 24, 1978, Ser. No. 963,196
Int. Cl.[3] G11B *21/02*
U.S. Cl. 179—100.1 G **14 Claims**



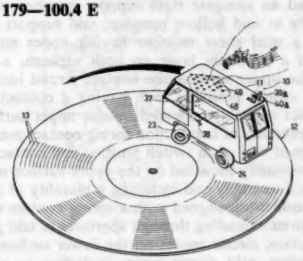
1. For use in an information storage and retrieval system having a detection means for deriving an information signal from an information track, apparatus for controlling the position of the detection means to follow the information track, said apparatus comprising:
first transducer means for moving the detection means transversely with respect to the information track;
second transducer means for deriving an information signal from the detection means;
means for generating an oscillatory dither signal for application to said first transducer means;
means for bandpass filtering said information signal to obtain an intermediate signal indicative of the effect of dither on said information signal;
means for correcting the phase of said dither signal to obtain a phase-corrected dither signal for correlation with said intermediate signal;
means for deriving an error signal from said intermediate signal and the polarity of said phase-corrected dither signal, wherein said error signal at any instant has a magnitude proportional to that of said intermediate signal and a polarity derived from the product of the intermediate signal polarity and the phase-corrected dither signal polarity; and
means for combining said error signal and said dither signal for application to said first transducer means.

4,232,202

RECORD PLAYER FOR A STATIONARY RECORD DISC

Yoshihisa Mori; Norio Mashimo, and Takeo Eguchi, all of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sep. 14, 1978, Ser. No. 942,269
Claims priority, application Japan, Sep. 19, 1977, 52-112486
Int. Cl.[3] G11B *3/40*
U.S. Cl. 179—100.4 E **14 Claims**



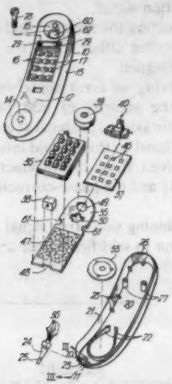
1. A record player for use on a stationary record disc having a surface on which signals are recorded in a spiral sound groove comprising
a freely movable body adapted to be steerably supported on said surface of the record disc for random movement in respect to the latter;
drive means operatively associated with said randomly movable body for propelling said movable body relative to the record disc;
sound pick-up means for engaging and tracking the spiral sound groove of said record disc and reproducing the signals recorded therein as said movable body is propelled;
means mounting said sound pick-up means in respect to said movable body for movement in a plane substantially parallel to the plane of the surface of said record disc; and
control means for steering said movable body and thereby controlling the direction of movement of said movable body on said record disc in response to movement of said sound pick-up means relative to said movable body while engaging and tracking the spiral groove on said record disc.

4,232,203

INTEGRAL TELEPHONE SET AND HANDSET

George V. Lenaerts, London, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Feb. 5, 1979, Ser. No. 9,655
Int. Cl.[3] H04M 1/02, 1/03
U.S. Cl. 179—103 11 Claims



1. An integral combined telephone set and handset comprising an elongate hollow member having a perforated mouth position at one end, a perforated ear position at the other end, and a pushbutton dial position intermediate the mouth and ear positions, and an elongate rigid support member extending longitudinally in said hollow member, said support member comprising a steel sheet member having upper and lower surfaces and a porcelain layer on both surfaces; a contact circuit on the upper surface, the contact circuit including a plurality of switch positions each having a contact area; a spring contact assembly mounted on the upper surface and including a plurality of snap-action spring contact members, a member aligned with each switch position and contact area; a pushbutton assembly mounted on the upper surface over said spring contact assembly and including a plurality of pushbuttons, each pushbutton aligned with a spring contact member; said pushbuttons extending through apertures at said pushbutton dial position; circuit means on the lower surface of said support member, said circuit means including an electrical circuit pattern and electrical devices connected to said circuit pattern and said contact circuit; a transmitter mounted at one end on said support member and adjacent to said mouth position; a receiver mounted at the other end on said support member and adjacent to said ear position; a line switch mounted in said hollow member and including actuating means extending from within said hollow member; and a ringer mounted in said hollow member, the arrangement such that said support member carries the electrical and electronic circuit components of a telephone set.

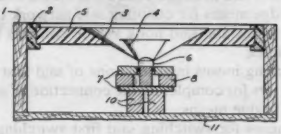
4,232,204

HIGH FIDELITY LOUDSPEAKER

Hernan H. Rojas, Santiago, Chile, assignor to Comercial e Industrial Sound-Tronic Ltd., Santiago, Chile

Filed Jun. 22, 1978, Ser. No. 917,886
Int. Cl.[2] H04R 9/06
U.S. Cl. 179—115.5 R 3 Claims

1. An acoustic box having side walls connected to a front panel through a resilient suspension, said front panel being made of expanded polystyrene and associated with a standard loudspeaker cone and a small diffuser cone which are concentric and are driven by a single common driving coil, said front panel operating as a low frequency reproducer, said standard cone operating as the panel driving means for the low frequency range and also as a reproducer for the medium frequencies, and the smaller diffuser operating as a high frequency reproducer, the whole arrangement conforming to an indivisible system and as an electro-acoustical transducer having a



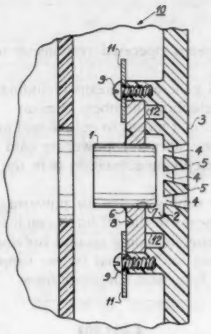
linear response in the audible range, and wherein the driving coil is embedded in a moulded plastic tube to prevent deformation, and said driving coil is permanently immersed in a magnetic field.

4,232,205

MICROPHONE MOUNT

Rene Ribeyre, Paris, France, assignor to Thomson-Brandt, Paris, France

Filed Aug. 1, 1978, Ser. No. 930,255
Claims priority, application France, Aug. 30, 1977, 77 26309
Int. Cl.[2] H04R 1/28
U.S. Cl. 179—146 R 4 Claims



1. A mounting fixture for mounting a microphone interiorly of a housing enclosure for enclosing a sound recording device, said sound recording device including mechanical transport means for a recording medium, and wherein the improvement comprises:

said mounting fixture including an intermediate member of lead placed between said microphone and said enclosure for providing support for and acoustic decoupling of said microphone from said enclosure; whereby vibrations transmitted from said transport means to said microphone are dampened.

4,232,206

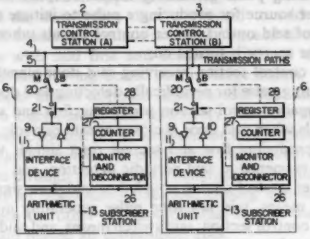
SIGNAL TRANSMISSION CONTROL SYSTEM

Eiji Tooyama, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

Filed Dec. 19, 1978, Ser. No. 971,110
Claims priority, application Japan, Dec. 19, 1977, 52-151818
Int. Cl.[2] H04B 3/46
U.S. Cl. 179—175.3 S 6 Claims

1. A signal transmission control system comprising; two individual signal transmission paths, a pair of transmission control stations one of which serves as a primary control station and being coupled to one of said signal transmission paths, while the other of said transmission control stations

serves as a stand-by control station coupled to the other of said signal transmission paths, and a plurality of subscriber stations normally connected to said one transmission path and adapted to perform reception and transmission of information data to one another in accordance with access signals issued from said primary transmission control station, wherein each of said subscriber stations is composed of first means for disconnecting the associated subscriber station a part of which is constituted by said first means itself from said one transmission path when said access signal is unavailable properly within a predetermined time span, second means for performing self-checking in



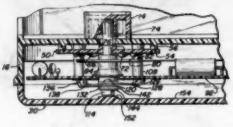
said associated subscriber station after said subscriber station has been disconnected from said one transmission path, means for holding said associated subscriber station in the disconnected state when abnormality is detected in said subscriber station as a result of said self-checking, and third means for switching said associated subscriber station to said other signal transmission path when no abnormality is found in said associated subscriber station as the result of said self-checking, and wherein upon occurrence of an abnormality in the signal transmission, the signal transmission control functions of said primary control station are transferred to said stand-by transmission control station.

4,232,207

ROTARY SWITCH ASSEMBLY

Bernhard R. Kuhl, Mount Prospect, and Edward J. Safranek, Arlington Heights, both of Ill., assignors to The Echlin Manufacturing Company, Branford, Conn.

Filed Jul. 5, 1978, Ser. No. 922,091
Int. Cl.³ H01H *19/54*
U.S. Cl. 200—11 R **5 Claims**



1. A switch comprising:

housing means having a first wall and a second wall displaced from and substantially parallel to said first wall, said first wall having a first aperture therein;

printed circuit board means having a second aperture therein and contact elements disposed about said second aperture, said printed circuit board means being mounted in said housing between said first and second walls with said first and second apertures in substantial alignment;

shaft means extending through said first and second apertures, including resilient contact means for selectively engaging certain of said contact elements in response to rotational positioning of said shaft means, said shaft means including a portion extending to and abutting said second wall to transmit externally generated longitudinal forces directed along the axis of said shaft means toward said housing means to said second wall whereby stresses exerted on said printed circuit board are reduced;

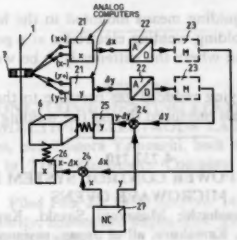
rotation control means mounted to said housing means and including detent means and post means, said shaft means including radially extending arm means disposed to be engagable with said detent means for establishing a plurality of substantially stable rotational positions for said shaft means and with said post means for limiting the rotational travel of said shaft means, said rotation control means further including an annular collar for slidably engaging said shaft means, said annular collar being substantially aligned with said second aperture and cooperatively operating therewith to position said shaft means to thereby substantially establish the axis of rotation of said shaft means.

4,232,208

APPARATUS AND METHOD FOR ELECTRICAL DISCHARGE MACHINING

Ernst Bühler, Tenero, Switzerland, assignor to A.G. für industrielle Elecktronik AGIE Losone b. Locarno, Losone, Switzerland

Filed Aug. 25, 1978, Ser. No. 936,027
Claims priority, application Switzerland, Mar. 6, 1978, 2419/78
Int. Cl.³ B23P *1//12*
U.S. Cl. 219—69 W **13 Claims**



1. In the art of electrical discharge machining of the type in which a workpiece (6) is cut by a wire electrode (1) which is guided between two guides (5) in a commanded guide path, including a rest or reference position

a method to correct for random, undesired deflection of the wire from the guide path comprising the steps of

commanding relative movement of the wire (1) and the workpiece (6) in said commanded guide path in accordance with command information;

said guide path having coordinate directions (x, y) perpendicular to each other;

measuring the deflection of the wire electrode from the rest position in said guide path in the two perpendicular coordinate directions by means of at least one displacement pick-up system (7), said displacement pick-up system being located around the wire electrode between the wire guides and the workpiece, and generating information indicative of the distance and direction of deflection of the wire from said rest position and hence the commanded guide path;

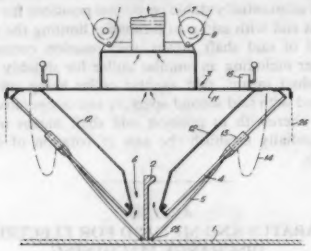
and substantially continuously correcting the commanded guide path of the wire electrode relative to the workpiece by additionally controlling the relative position of the electrode and the workpiece as a function of the deflection information in such a way that the deflected wire electrode remains positioned on its commanded path.

4,232,209

APPARATUS FOR WELDING OF STIFFENERS OR THE LIKE ON A PLATE

Einar Pedersen, N. Varasen 7, 5200 Os, Norway, assignor to Einar Pedersen, Os, Norway

Filed Sep. 13, 1978, Ser. No. 941,780
Claims priority, application Norway, Sep. 15, 1977, 773179
Int. Cl.³ B23K *9/32, 9/12, 9/28*
U.S. Cl. 219—137.41 **16 Claims**



1. Apparatus for welding of stiffeners or the like to a plate comprising:

a box having a longitudinal dimension for accepting a portion of the length of a stiffener, said box having a slot along a wall thereof through which the stiffener extends into the interior of the box,

means for positioning the box relative to the stiffener to be welded,

a plurality of guiding means mounted to the box along its length for holding welding electrodes at a position adjacent the place where the stiffener is to be welded to the plate, and

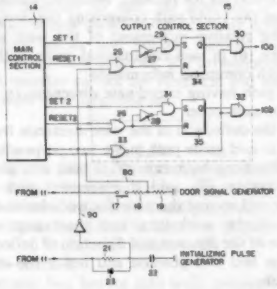
means for applying reduced gas pressure to the box to remove materials produced during the welding operation.

4,232,210

OUTPUT POWER CONTROL SYSTEM FOR MICROWAVE OVENS

Yoshio Oida, Funabashi; Masayuki Sasaki, Kawasaki, and Hidetoshi Semi, Kamakura, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Japan

Filed Jun. 22, 1978, Ser. No. 918,151
Claims priority, application Japan, Jun. 22, 1977, 52-73300
Int. Cl.² H05B *9/06*
U.S. Cl. 219—10.55 C **3 Claims**



1. An output power control system for a microwave oven, comprising:

an AC power source;

a magnetron tube for microwave oscillation;

switch means and a semiconductor element connected in series between said AC power source and said magnetron tube for controlling the power to said magnetron tube;

a DC power source coupled to said AC power source; and

an output power control circuit coupled to said DC power source and supplying first and second control signals to said switch means and said semiconductor element, respectively;

said output power control circuit comprising:

a door signal generating means coupled to said DC power source for producing door signals representing the open and closed state of a door of said microwave oven;

an initiating pulse generating means coupled to said DC power source for producing a pulse to initiate the operation of said output power control circuit when said AC power source is turned on;

a main control section receiving said door signal and said initiating pulse for periodically detecting said door signals, said main control section producing first and second set signals when said door is closed at said periodic detection and producing first and second reset signals when said door is opened at said periodic detection; and

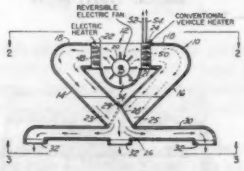
an output control section coupled to said door signal generating means, said initiating pulse generating means, said main control section, said switch means, and said semiconductor element, said output control section comprising first means which produces said first and second control signals for causing said magnetron tube to oscillate when receiving said first and second set signals and which stops producing said first and second control signals when receiving said first and second reset signals, and second means which instantaneously stops said first and second control signals when said door is opened during the oscillation period of said magnetron tube.

4,232,211

AUTOMOBILE AUXILIARY HEATER

Johnnie L. Hill, 18272 Pinehurst, Detroit, Mich. 48221

Filed Oct. 19, 1978, Ser. No. 952,709
Int. Cl.³ B60H *1/02;* **F24H** *3/02;* **H05B** *3/00*
U.S. Cl. 219—202 **9 Claims**



1. An auxiliary heating device for an automobile having an electrical supply circuit and an engine liquid cooling system, said heating device comprising

a housing structure including a main air inlet duct having therein a fan chamber with an outside air intake passageway leading thereto and also including first and second branch air outlet ducts connected to said main air duct at spaced locations thereon on opposite sides of said fan chamber,

said first and second branch outlet ducts having first and second individual air outlets respectively disposed remote from said main air inlet duct,

an electric air heater disposed in the space between said fan chamber and said first branch air outlet duct and adapted

to be electrically connected to the automobile electrical supply circuit,

an engine liquid air heater disposed in the space between said fan chamber and said second branch air outlet duct and adapted to be connected to the automobile engine liquid cooling system,

a reversible electric fan in said fan chamber constructed and arranged to draw outside air through said outside air intake passageway and to discharge the thus indrawn air into either said first branch outlet duct or said second branch outlet duct in response to rotation of said reversible electric fan in opposite directions,

a heated air distribution duct connected to said first and second branch air outlet ducts and disposed in communication with said first and second individual air outlets thereof and having heated air discharge means,

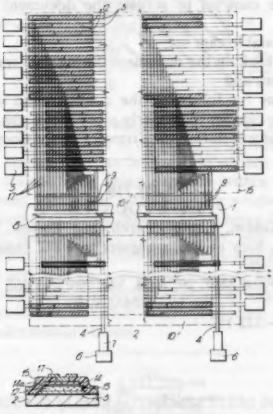
and damper means disposed adjacent said first and second branch duct outlets and selectively movable alternately between opposite positions simultaneously opening communication between the one of said individual branch duct outlets through which air is discharged by the fan and said heated air distribution duct and closing communication between the other of said individual branch duct outlets and said heated air distribution duct.

4,232,212

THERMAL PRINTERS

David R. Baraff, Ottawa, and Lawrence H. Hobbs, West Carleton, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Oct. 3, 1978, Ser. No. 948,240
Int. Cl.³ H05B *1/00*
U.S. Cl. 219—216 **12 Claims**



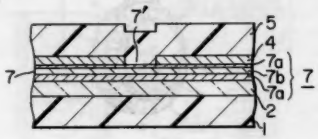
1. A thermal printing device comprising an electrically insulating substrate supporting a film of resistive material and first and second conductor patterns electrically contacting said film of resistive material so as to establish resistive heating paths through said resistive material between closely spaced end parts of said first and second conductors, the conductors of the first pattern being matrix-addressed by a third pattern of conductors, the conductors of the third pattern electrically connected to respective sets of said first pattern of conductors at contact regions formed as rectifying junctions remote from the resistive material, the second and third conductor patterns being tailored for application of addressing signals.

4,232,213

THERMAL HEAD

Nobuyoshi Taguchi, Higashiosaka; Koji Matsuo, Nara; Hiromu Takahashi, Hirakata, and Fujio Oda, Ashiya, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 15, 1979, Ser. No. 3,537
Int. Cl.³ H05B *1/00*
U.S. Cl. 219—216 **5 Claims**



1. In a thin-film thermal head comprising an insulating substrate having a glass layer on the surface thereof, a thin-film heat-generating resisior layer formed on said insulating substrate, a pair of electrodes formed on said thin-film heat-generating resistor layer to form a heat-generating section, and a wear-resistant layer formed to protect said heat-generating section;

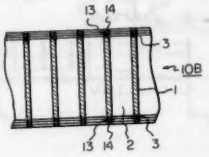
wherein said thin-film heat-generating resistor layer comprises a low resistivity layer made of an alloy of Si and a particular metal of high melting point and a high resistivity layer including at least Si, said low resistivity layer being formed on said glass layer of said insulating substrate through said high resistivity layer.

4,232,214

PTC HONEYCOMB HEATING ELEMENT WITH MULTIPLE ELECTRODE LAYERS

Ryoichi Shioi, and Tamotu Yamauchi, both of Nikaho, Japan, assignors to TDK Electronics Company Limited, Tokyo, Japan

Filed Feb. 22, 1979, Ser. No. 14,283
Claims priority, application Japan, Feb. 22, 1978, 53/18573; Feb. 22, 1978, 53/18574
Int. Cl.³ H05B *3/08*
U.S. Cl. 219—541 **14 Claims**



1. A heating element comprising a semiconductor ceramic body of a honeycomb structure, the material of said semiconductor ceramic body having a positive temperature coefficient of resistance over a Curie point and composed of barium titanate, wherein a pair of inner electric conductive layers comprising mainly silver are provided on both end surfaces of said semiconductor ceramic body, electrically connected to a source for supplying power to said semiconductor ceramic body, and wherein an outer electric conductive layer consisting of at least one metal selected from the group, which consists of nickel, zinc and chromium is provided on each of the inner layers.

4,232,215
HUMAN REPRODUCTION INDEXING DEVICE

John P. Hanley, 625 Ivy Ct., Kenilworth, Ill. 60043

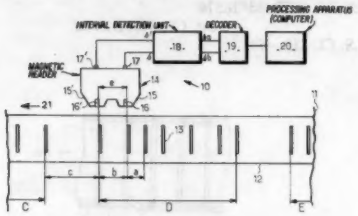
Filed Oct. 2, 1978, Ser. No. 947,568
Int. Cl.[3] G06C *3/00, 27/00*
U.S. Cl. 235—78 RC 16 Claims

1. An indexing device comprising: a base member having calendar indicia representing the calendar dates for the days of one month interval disposed on at least one surface thereof, and an index member having indexing means including an indexing portion and an indicator portion, said index member being assembled together with said base member and being movable relative thereto to permit said indexing portion to be selectively aligned with said calendar indicia, said indicator portion being disposed in a predetermined relationship relative to said indexing portion whereby when said index member is set with said indexing portion aligned with a given one of the calendar indicia, said indicator portion is located to indicate a preselected group of the calendar dates.

4,232,216
METHOD AND DEVICE FOR READING CODED INFORMATION IN THE FORM OF INTERVALS OF PREDETERMINED SIZES

Michel Helle, Marcq, France, assignor to Compagnie Internationale pour l'Informatique CII-Honeywell Bull (Societe Anonyme), Paris, France

Filed Dec. 12, 1978, Ser. No. 968,789
Claims priority, application France, Dec. 30, 1977, 77 39749
Int. Cl.[2] G06K *7/10, 7/08;* G11B *5/09;* G06K *9/04*
U.S. Cl. 235—449 16 Claims



1. A method of recognizing an item of information defined by a plurality of different intervals between consecutive pulses of a first pulsed signal, said method comprising:

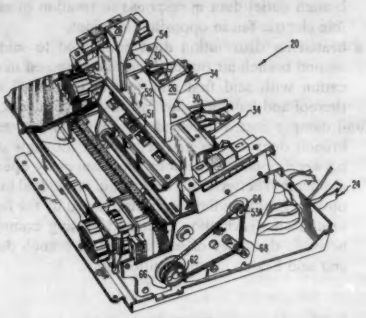
generating a second pulsed signal the pulses of which are delayed with respect to corresponding pulses of the first pulsed signal by a delay interval e; and

comparing the first and second pulsed signals to produce an output signal representing the item of information, the delay interval being selected and the comparison being such that a first interval a is identified when a leading edge of a pulse of the second signal occurs during a pulse of the first signal and a second interval b is identified when a trailing edge of a pulse of the second signal occurs during a pulse of the first signal.

4,232,217
STEPPER MOTOR DRIVE FOR A MECHANICAL CAMSHAFT

Jurgen A. Juziuk, Livonia; Ronald H. Mack, Plymouth; Eugene F. Banka, Livonia, all of Mich., and Edward A. Nicol, San Diego, Calif., assignors to Burroughs Corporation, Detroit, Mich.

Filed Apr. 27, 1979, Ser. No. 33,890
Int. Cl.[3] G06K *13/00, 13/02, 13/16, 13/20*
U.S. Cl. 235—480 6 Claims



1. A drive system for processing passbook data comprising:

an incremental drive for actuating the system;

means for controlling the incremental drive;

a first rotatable cam set;

means for sensing data on a document;

first means for following the configuration of the first rotatable cam set to position the sensing means;

a second rotatable cam set;

means for positioning the documents;

second means for following the configuration of the second rotatable cam set to actuate the document positioning means;

a third rotatable cam set;

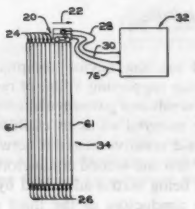
means for backing the document during data transfer to the document; and

third means for following the configuration of the third rotatable cam set to properly place the means for backing the document during data transfer to the document.

4,232,218
PLATE COUNTER

Hobart E. Kenton, Lower Burrell, and Forrest W. Decker, Pittsburgh, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 29, 1978, Ser. No. 891,365
Int. Cl.[2] G06M *9/00*
U.S. Cl. 250—222 PC 8 Claims



1. An apparatus for determining number of sheets in a stack, the shets each having an energy reflecting surface portion, comprising:

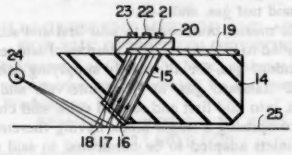
a carriage;
means mounted on said carriage for directing energy rays toward a side of the stacked sheets;
means for sensing density of reflected energy rays mounted on said carriage in spaced relation to said means for directing energy rays;
means connected to said sensing means for generating a density signal;
first wheel means mounted on said carriage adjacent said means for directing energy rays;
second wheel means mounted on said carriage in spaced relation to said first wheel means and adjacent said sensing means;
means for generating a signal indicating relative displacement as said carriage moves on said first or second wheel means from a predetermined location along said side of the stacked sheets;
means for interconnecting said first wheel means; said second wheel means and said means for generating a displacement signal when at least one of said wheel means moves over the stacked sheets; and
means for acting on the density signal and the displacement signal to determine the number of sheets in the stack.

4,232,219

PHOTOSENSOR

Hideaki Yamamoto, Hachioki; Toshihisa Tsukada, Sekimachi; Eiichi Maruyama, Kodaira, and Hiroya Inagaki, Sekimachi, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation and Hitachi, Ltd., both of, Japan

Filed Feb. 27, 1979, Ser. No. 15,615
Claims priority, application Japan, Mar. 3, 1978, 53/23461
Int. Cl.[3] G02B *5/14*
U.S. Cl. 250—227 **14 Claims**



1. A photosensor comprising a fiber substrate having a light-receiving window formed in one surface thereof, the one surface being spaced from an information surface to be read, a bundle of optical fibers being disposed within said substrate and positioned within said light-receiving window, a plurality of color filters of different characteristics being disposed on an end face of said bundle of optical fibers, and a plurality of arrays of photosensitive elements corresponding to said color filters, said arrays of photosensitive elements being integrated onto said fiber substrate and disposed in the region of the end face of said bundle of optical fibers positioned farthest away from the information surface.

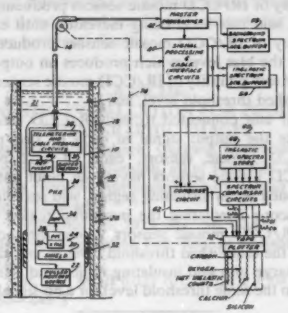
4,232,220

BACKGROUND SUBTRACTION SYSTEM FOR PULSED NEUTRON LOGGING OF EARTH BOREHOLES

Russel C. Hertzog, Ridgefield, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed May 4, 1979, Ser. No. 36,201
Int. Cl.[2] G01V *5/00*
U.S. Cl. 250—270 **15 Claims**

1. A method for determining the characteristics of earth formations surrounding a well borehole comprising the steps of:
repetitively irradiating the earth formations surrounding the well bore with relatively short duration pulses of high energy neutrons;
detecting during each such pulse of high energy neutrons, gamma radiation due to the inelastic scattering of neutrons by materials comprising the earth formations surrounding the borehole and providing information representative thereof;
detecting immediately following each such pulse of high



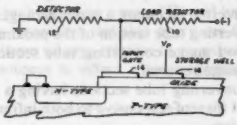
energy neutrons, background gamma radiation due to thermal neutron capture and providing information representative thereof; and
correcting said inelastic gamma representative information to compensate for said background representative information.

4,232,221

METHOD AND APPARATUS FOR TRIMMING IR/CCD MOSAIC SENSORS

Michael F. Millea, Manhattan Beach, and David H. Seib, Costa Mesa, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 22, 1979, Ser. No. 5,111
Int. Cl.[3] G01N *23/00*; H01J *37/00*
U.S. Cl. 250—311 **5 Claims**



1. A threshold level trimming apparatus for IR/CCD mosaic sensors comprising in combination:
a scanning electron microscope for irradiating a specimen, said scanning electron microscope producing an electron beam output, said scanning electron microscope including a cathode ray tube unit for visual observation of said specimen,
an IR/CCD sensor unit comprising a plurality of IR/CCD mosaic sensors, said IR/CCD sensor unit being positioned

in said scanning electron microscope for exposure to said electron beam output, said IR/CCD sensor unit being registered within the scanning electron microscope coordinate system to permit any region of said IR/CCD sensor unit to be irradiated, a bias level being applied to each of said plurality of IR/CCD mosaic sensors, some of said plurality of IR/CCD mosaic sensors producing an output signal, said bias level being increased until each of said plurality of IR/CCD mosaic sensors produce an output signal, the bias level which produces an output signal in each of said plurality of IR/CCD mosaic sensors being the established threshold level, and,

a readout unit connected to said IR/CCD sensor unit to indicate the output signal in each of said plurality of IR/CCD mosaic sensors, each of said plurality of IR/CCD mosaic sensors having an input gate which is positioned on an insulating region, said scanning electron microscope irradiating the insulating region of each of said IR/CCD mosaic sensors whose threshold level is below the established threshold level to introduce a positive charge into said insulating region and bring all input gates to the same threshold level for a no-signal condition.

4,232,222

BINOCULAR NIGHT GLASS

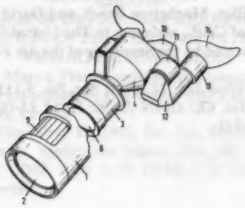
Johan H. M. Deltrap, Oostvoorne, Netherlands, assignor to N.V. Optische Industrie "De Oude Delft", Delft, Netherlands

Filed Sep. 1, 1978, Ser. No. 938,762

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1977, 2739927

Int. Cl.³ H01J *31/49*

U.S. Cl. 250—333 **4 Claims**



1. A binocular night glass for both infrared and visible light, comprising

an image converter including a series arrangement of a first image converting tube section of the proximity-focus type and a second image converting tube section which produces an image reversal,

said image converting tube sections having a photocathode on the front thereof responsive to both infrared and visible light radiation,

said image converting tube sections having an image screen on the rear thereof for producing an intensified image,

an optical input system including a front object lens and a ring for adjusting the focal point of the front object lens for forming an image on the photocathode on the front of the image converter,

a collimating lens having a focal plane located in the image screen on the rear of the image converter,

a central tube member housing said image converter and said collimating lens,

a pair of viewing devices each including a pair of 90° prisms, an object lens interposed between each pair of prisms, and an eye piece receiving respective portions of the parallel rays from the collimating lens to form a binocular with said collimating lens, and

said prisms arranged so that light paths through the viewing devices are reflected alongside the central tube member over the collimating lens to position the eye pieces closely behind the plane defined by the rear end of the central tube member.

4,232,223

GAS ANALYZER

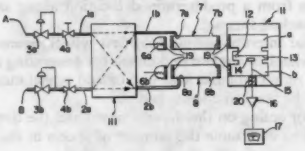
Toshikazu Ohnishi; Kozo Ishida, and Osamu Saitoh, all of Miyanohigashi, Japan, assignors to Horiba, Ltd., Kyoto, Japan

Filed Jun. 19, 1979, Ser. No. 49,971

Claims priority, application Japan, Oct. 18, 1978, 53-128756

Int. Cl.² G01N *21/26*

U.S. Cl. 250—343 **5 Claims**



1. A gas analyzer for measuring the concentration of a gaseous component in a test gas, said gas analyzer comprising:

first and second separate cells adapted to alternately be filled with a test gas containing a gaseous component to be analyzed and a standard gas;

light source means for directing rays of energy through said first and second cells and through the said test gas and standard gas alternately contained therein;

detector means, positioned to receive said rays of energy after passage thereof through said first and second cells, for detecting the concentration of said gaseous component within said test gas; and

changeover means, connected to said first and second cells and adapted to be connected to sources of said test gas and said standard gas, for alternately supplying said test gas and said standard gas, at fixed intervals and in fixed amounts, into said first and second cells, said changeover means comprising a single block having therein first and second inlets adapted to be connected to said source of test gas and said source of standard gas, respectively, first and second outlets respectively connected to said first and second cells, and rotary valve means movable between a first position respectively connecting said first and second inlets with said first and second outlets and a second position respectively connecting said first and second inlets with said second and first outlets.

4,232,224

NUCLEAR REACTOR PRIMARY COOLANT LOOP FLOWMETER WITH PHASE SHIFT TRACKING COMPENSATION

Kingsley F. Graham, Murrysville, and Raj Gopal, Churchill, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

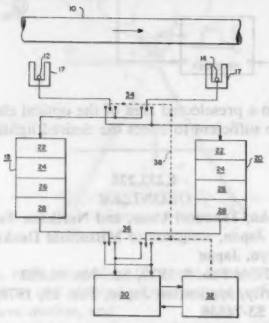
Filed Sep. 28, 1978, Ser. No. 946,463

Int. Cl.² G01F *1/00*

U.S. Cl. 250—356 **8 Claims**

1. An improved nuclear reactor primary coolant loop flowmeter having a first detector positioned substantially adjacent to the coolant loop at a first location, which is responsive to the gamma radiation emanating from the Nitrogen-16 activity within the reactor coolant at the first location to provide a representative electrical output, a first detector channel for conditioning and communicating the first detector's output, a second detector positioned substantially adjacent to the coolant loop at a second location downstream of the first location, which is responsive to the gamma radiation emanating from the Nitrogen-16 activity within the reactor coolant at the

second location to provide a representative electrical output, a second detector channel for conditioning and communicating the second detector's output, and means having inputs from the first and second detector channels' outputs for cross-correlating the first and second detectors' outputs and delaying the first output with respect to the second until the cross-correlation function approaches a maximum so as to determine the delay time between corresponding points in the first and sec-



ond outputs, wherein the improvement comprises means for switching the first detector output to the second detector channel and the second detector output to the first detector channel and means for adding the delay times monitored between corresponding points in the first and second outputs by the cross-correlating means with the first and second detectors connected in both switching positions to provide an output proportional to the primary coolant flow rate.

4,232,225

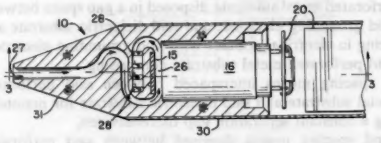
CHEMILUMINESCENT METHOD AND APPARATUS FOR THE DETECTION OF OZONE

Jagir S. Randhawa, Las Cruces, N. Mex., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 19, 1979, Ser. No. 4,625

Int. Cl.³ G01T *1/20*

U.S. Cl. 250—361 C **7 Claims**



1. An apparatus for the continuous detection and measurement of ozone in the atmosphere as a function of altitude, said apparatus comprising a main body portion and a nose portion, said main body portion housing a reaction chamber, detector and amplifying means for generating a signal proportional to the concentration of ozone in said reaction chamber, a body of ozone reactive chemiluminescent material in said reaction chamber, a transmitter means for transmitting said signal, said nose portion being frustoconical for aerodynamic stability and having an opening communicating with a duct for the admission of an ambient air flow through said opening into said duct, said air flow occurring as said apparatus falls through said atmosphere, said duct excluding stray light and directing said air flow into said reaction chamber over and in contact with said body of chemiluminescent material, the ozone in said air flow reacting with said chemiluminescent material to form molecular oxygen and emit light, said air flow being directed in a continuous stream through said reaction chamber into at least one exit duct and an exit chamber, said exit duct excluding stray light from said reaction chamber, said exit chamber including a pair of openings on opposite sides directing said air flow equally through said openings out of said apparatus to maintain equilibrium, the light emitted by the reaction of said ozone with said chemiluminescent material being proportional to the concentration of ozone in said air flow and being detected by said detector and amplifying means, the signal generated by said detector and amplifying means being transmitted to a receiver for visual display.

4,232,226

DIAGNOSTIC INSTALLATION FOR PRODUCING TOMOGRAPHIC IMAGES

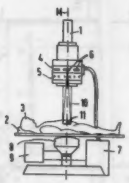
Robert Huettner, Heroldsbach; Gerhard Kuetterer, and Hartmut Sklebitz, both of Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jul. 25, 1979, Ser. No. 60,417

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1978, 2836282

Int. Cl.³ A61B *6/00, 6/02;* G21K *1/04*

U.S. Cl. 250—445 T **15 Claims**



1. A diagnostic installation for producing laminographic images, comprising a support table for a patient, a plurality of radiation sources arranged in an array on one side of the support table and each being operable for producing a beam of rays penetrating the patient lying on the support table, and an image detection installation on the other side of the support table, and means for effecting the activation of the radiation sources in a desired sequence, and for controlling the image field of the image detection installation in a coordinated manner so that sharply defined images are formed of only those details disposed at a common layer region where the beams of rays converge and intersect a corresponding longitudinal layer of the body, characterized in that beam path control means (**21*a*-21*q***) are arranged in every path of rays of the radiation beam (**10**), of each radiation source (**6**), said beam path control means having respective shiftable apertures for adjusting the path of each beam of rays relative to an axis (M) of the array of radiation sources to effect a laminographic depth adjustment.

4,232,227

X-RAY EXAMINATION APPARATUS

Johann Finkenzeller; Guënter Holzermer, and Gerhard Wenzek, all of Erlangen, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Sep. 18, 1978, Ser. No. 943,069

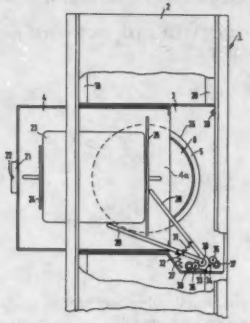
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1977, 2744139

Int. Cl.² G03B *41/16*

U.S. Cl. 250—468 **8 Claims**

1. An x-ray examination apparatus comprising an examination table (**1**), a patient support platform (**2**) resting on the examination table, an x-ray source with a remote-controllable collimator restricting the radiation beam, a longitudinal transport carriage (**3**) transportable along the length of and supported by the patient support platform, and a cassette support (**4**) capable of insertion into an operating position on the longitudinal transport carriage and having clamping means (**24, 25**)

mounted thereon for positioning an insertable x-ray film cassette in fixed relation to said cassette support, said cassette support having means comprising said clamping means for providing cassette receiving regions of continuously varying size within a predetermined range, two sensor means (28, 29) being mounted on the transport carriage (3) and being operable in a sensing condition for sensing the length and width of the x-ray film cassette (23) clamped in the inserted cassette support (4), mechanical-electrical transducers (37, 38) mounted by the longitudinal transport carriage and each coupled with a respective one of said sensor means and continuously operated as a function of the mechanical position of the associated sensor means while the sensor means is in said sensing condition, and means comprising said sensor means and the mechanical-electrical transducers both mounted in the longitudinal transport carriage for enabling the complete removal of the cassette support from the longitudinal transport carriage without removing the sensor means and without removing the mechani-



cal-electrical transducers from their mounted relationship to said longitudinal transport carriage, said sensor means having sensor positioning means (31–34) for automatically moving said sensor means to respective rest positions during removal of the cassette support from the longitudinal transport carriage, one of said sensor means (28) being positioned by said sensor positioning means so as to be displaced from its rest position in accordance with the dimension of a cassette parallel to the cassette support insert direction when the cassette support (4) with the cassette secured in said cassette receiving region is inserted into said operating position on the longitudinal transport carriage, and the other of said sensor means (29) being actuated from its rest position for sensing the transverse dimension of a cassette occupying said cassette receiving region with the displacement of the one sensor means (28) from its rest position, such cassette transverse dimension being transverse to the cassette support insertion direction in which the cassette support is inserted into said operating position on the longitudinal transport carriage.

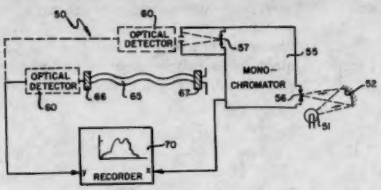
4,232,228

METHOD OF LIGHTENING RADIATION DARKENED OPTICAL ELEMENTS

Frederich R. Reich, Richland, and Albert R. Schwankoff, W. Richland, both of Wash., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 7, 1979, Ser. No. 64,597
Int. Cl.³ A61K *27/02*
U.S. Cl. 250—492 R **19 Claims**

1. A method of lightening a radiation-darkened optical element, comprising directing electromagnetic radiation having a wavelength in the range of from about 2000 to about 20,000



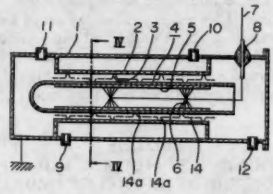
angstroms into a preselected area of the optical element for a period of time sufficient to effect the desired lightening.

4,232,229

OZONIZER

Masaaki Tanaka; Takanori Ueno, and Norikazu Tabata, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 9, 1979, Ser. No. 10,683
Claims priority, application Japan, Feb. 13, 1978, 53-15129; Jun. 20, 1978, 53-74538
Int. Cl.³ C01B *13/12*
U.S. Cl. 250—541 **12 Claims**



1. An ozonizer comprising:
a pair of electrodes including a grounding electrode and a high voltage electrode;
a dielectric substrate disposed between said grounding electrode and said high voltage electrode;
a perforated metal substrate disposed in a gap space between said grounding electrode and said dielectric substrate and being in electrical contact with said grounding electrode, said perforated metal substrate comprising,
first spacing means interspaced between said perforated metal substrate and said dielectric substrate for maintaining a constant separation gap therebetween,
second spacing means disposed between said perforated metal substrate and said grounding electrode to maintain said perforated metal substrate in position between said dielectric substrate and said grounding electrode,
wherein a uniform separation distance promoting a uniform silent discharge is maintained between said perforated metal substrate and said dielectric substrate by said first and second spacing means.

4,232,230

OCEAN WAVE ENERGY CONVERTER

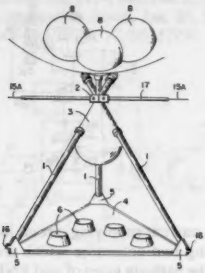
Foerd Ames, 8 Wawatek Rd., Cold Spring Harbor, N.Y. 11724

Filed Jun. 14, 1979, Ser. No. 48,324
Int. Cl.³ F03B *13/10*
U.S. Cl. 290—53 **5 Claims**

1. Apparatus for converting the energy of wave motion on the surface of a body of water to electricity, comprising:
(a) a plurality of linear electric generators, each including a tubular outer member surrounding a relatively reciprocable inner member.

(b) structural means maintaining said generators in a fixed relationship to each other, approximating elements of a cone, said outer members crossing in near intersection in the region of the apex thereof.

(c) a plurality of flotation devices disposed above said apex



region, each secured to the inner member of one of said generators and adapted to ride on said surface and follow the wave motion, and

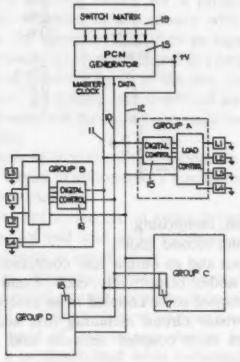
(d) a damper plate attached to the lower ends of said outer generators members and adapted to be disposed below said surface in a region relatively free of wave motion.

4,232,231

ROAD VEHICLE ELECTRICAL SYSTEMS

Kenneth R. B. Reed, Solihull, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Jan. 15, 1979, Ser. No. 3,684
Int. Cl.³ H04Q *3/00*; H02J *1/00*
U.S. Cl. 307—10 R **2 Claims**



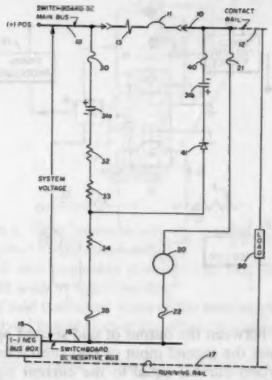
1. An automotive vehicle electrical system comprising a plurality of switch devices, a multiplicity of load devices each controlled by a corresponding load control device arranged in a number of groups, a transmitter device controlled by said switches and a plurality of receiver devices associated respectively with said groups of load control devices, the transmitter device cyclically generating on a data rail connected to all said receivers a pulse train consisting of a series of digital words, each such word including a first set of bits defining an address code appropriate to one of the receivers and a second set of bits defining a utilization code indicating the required state of the load control devices in the group associated with that receiver in accordance with the condition of associated ones of the switch devices, and wherein each receiver includes an input register for receiving signals from said data rail, address code recognition means operative when the address code part of each word has been received by the input register and means controlled by said address code recognition means for preventing the input register from receiving command data from the data rail except when said address code recognition means has recognised the address code forming the first part of the data word.

4,232,232

VOLTAGE SENSING AND LOAD MEASURING AUTOMATIC RECLOSING SYSTEM FOR D-C CIRCUIT BREAKERS

James P. DeLacy, Havertown, and Robert H. Lechner, Southampton, both of Pa., assignors to Gould Inc., Rolling Meadows, Ill.

Filed Jan. 22, 1979, Ser. No. 5,190
Int. Cl.³ H02H *11/00*
U.S. Cl. 307—139 **9 Claims**



1. The process of monitoring the condition of a feeder circuit and operating a d-c feeder breaker in the feeder circuit comprising the steps of:

monitoring the voltage in a voltage-measuring mode across said feeder circuit and closing said breaker if the feeder voltage is above a first value, or initiating a load-measuring mode if said feeder voltage is lower than a second value that is lower than said first value;

when in said load-measuring mode, injecting a current into said feeder circuit and measuring the voltage drop across said feeder circuit in response to the injected current;

maintaining said feeder breaker open when the voltage measured during said load-measuring mode is below a given value;

and closing said feeder breaker when said voltage measured during said load-measuring mode is above said given value.

4,232,233

METHOD FOR EXTENDING TRANSISTOR LOGARITHMIC CONFORMANCE

David E. Clouser, Claymont, Del., and Steven J. Engel, West Chester, Pa., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Dec. 29, 1978, Ser. No. 974,582
Int. Cl.³ G06G *7/24*
U.S. Cl. 307—229 **7 Claims**

1. Apparatus comprising,

a thermal conductivity detector,

a first operational amplifier having an inverting input, a non-inverting input, and an output,

a first resistor connected between the output of said thermal

conductivity detector and the said inverting input of said first operational amplifier,

means connecting the non-inverting input of said first operational amplifier to a point of reference potential,

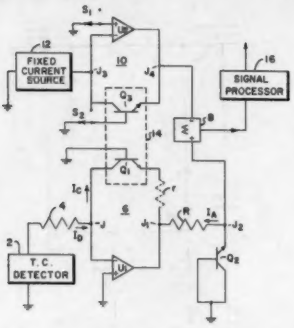
a first transistor having its emitter connected to the output of said first operational amplifier, its base connected to a point of reference potential, and its collector connected to the inverting input of said first operational amplifier,

a second transistor connected as a diode and a second resistor connected between a point of reference potential and the output of said first operational amplifier,

a subtracting means having first and second inputs and an output,

a connection between the first input of said subtracting means and the junction of said second resistor and said second transistor,

a second operational amplifier having inverting and non-inverting inputs and an output,



a connection between the output of said second operational amplifier and the second input of said subtracting means,

a source of fixed current equal to the current supplied by said thermal conductivity detector to the inverting input of said first operational amplifier under a no-signal condition,

a connection between said source and the inverting input of said second operational amplifier,

a third transistor having its emitter connected to the output of said second operational amplifier and its collector connected to inverting input of said second operational amplifier,

said first and third transistors being a matched pair,

means for setting the non-inverting input of said second operational amplifier at a given potential with respect to the reference potential, and

means for setting the base of said third transistor at a potential having a predetermined relationship to the reference potential.

4,232,234

SEMICONDUCTOR SWITCH CIRCUIT

Shinzi Okuhara, Fujisawa; Ichiro Ohhinata, Yokohama, and Michio Tokunaga, Zushi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jun. 28, 1977, Ser. No. 811,143
Claims priority, application Japan, Jul. 2, 1976, 51/77796
Int. Cl.² H03K *17/72*
U.S. Cl. 307—252 G **4 Claims**

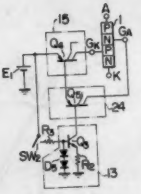
1. A semiconductor switch circuit comprising:

a bilateral switch including a pair of 4-terminal PNPN switches connected in inverse parallel, each having a cathode gate and an anode gate;

a current supplying circuit for supplying a current to the cathode gates of said bilateral switch;

a current sinking circuit of constant current type; and

a current change-over circuit including current path change-over means for selectively switching a current flowing out from the anode gates of said bilateral switch and a current driving said current supplying circuit, respectively, to said current sinking circuit depending on a potential of said PNPN switches constituting said bilateral switch,



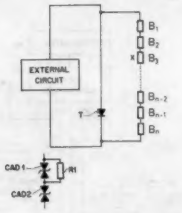
wherein said current supplying circuit includes a PNP transistor having two collectors which are respectively connected to the cathode gates of said PNPN switches constituting said bilateral switch.

4,232,235

COMBINING THYRISTOR CIRCUITS OF VARIOUS CIRCUIT CONFIGURATIONS

Werner Faust, Wettingen, and Peter Etter, Oberehrendingen, both of Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Continuation of Ser. No. 700,560, Jun. 28, 1976, abandoned.
This application Jan. 9, 1978, Ser. No. 867,945
Claims priority, application Switzerland, Jul. 2, 1975, 8575/75
Int. Cl.² H03K *17/72*
U.S. Cl. 307—252 R **12 Claims**



1. A circuit, comprising:

(A) first and second nodes;

(B) an input and an output lead connected to said first and second nodes, respectively, each of said input and output leads adapted to be coupled to an external circuit; and

(C) a thyristor circuit including first and second parallel branches each coupled between said first and second nodes;

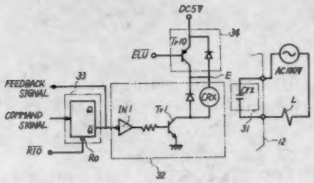
(1) said first branch consisting of a thyristor, the anode of said thyristor being directly coupled to one of said first and second nodes, the cathode of said thyristor being directly coupled to the other of said first and second nodes; and

(2) said second branch including a plurality of series connected sub-circuits, each of said sub-circuits including at least one electrical element, at least two of said sub-circuits having different voltage-current characteristic curves, at least one of said sub-circuits including first and second sub-branches connected together in parallel, said first sub-branch containing a controlled avalanche diode comprising first and second series connected diodes connected in opposed polarity fashion and exhibiting controlled avalanche behavior, and said second sub-branch including a resistor.

4,232,236
OUTPUT CONVERTING CIRCUIT FOR A PROGRAMMABLE SEQUENCE CONTROLLER

Toshihiko Yomogida, Kariya, and Yasuo Suzuki, Aichi, both of Japan, assignors to Toyoda-Koki Kabushiki-Kaisha, Aichi, Japan

Filed Jan. 16, 1979, Ser. No. 3,790
Claims priority, application Japan, Jan. 30, 1978, 53-9125
Int. Cl.³ H03K *17/06, 17/30*
U.S. Cl. 307—297 **4 Claims**



1. An output converting circuit for a programmable sequence controller wherein, in accordance with a sequence control program, the operational state of an input element is tested so as to generate a command signal to energize or deenergize a load based upon the result of the test, comprising:

a memory circuit for storing said command signal;

a load drive element connected between said load and a first electric supply;

a load drive element control circuit responsive to said command signal stored in said memory circuit for controlling said load drive element;

a switching element connected in series between a power input terminal of said load drive element control circuit and a second electric supply; and

a supply voltage detecting circuit for detecting a voltage level of said second electric supply so as to output a signal to enable said switching element to switch on only when the voltage level of said second electric supply is not lower than a predetermined level sufficient for normal operation of said load drive element control circuit.

4,232,237
ASYNCHRONOUS LINE-FED MOTOR

Alexandr D. Popov, ulitsa Koroleva, 12, kv. 154, and Vladimir A. Solomin, ulitsa Dachnaya, 14, kv. 31, both of Rostov-na-Donu, U.S.S.R.

Filed Jun. 11, 1979, Ser. No. 47,251
Claims priority, application U.S.S.R., Jun. 12, 1978, 2632465
Int. Cl.³ H02K *41/00*
U.S. Cl. 310—13 **2 Claims**

1. An asynchronous line-fed motor comprising:

an inductor with a magnetic circuit and a concentrated multiphase winding;

a secondary current-carrying element arranged in immediate proximity to said inductor and separated by an air gap from said magnetic circuit;

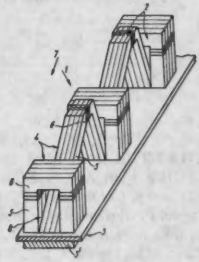
said magnetic circuit containing two groups of laminated cores;

each of said laminated cores being composed of rods linked by a yoke;

said inductor and said secondary current-carrying element being movable relative to each other to produce a traveling magnetic field;

the lamination of said cores of the first group being perpendicular to the direction of travel of the magnetic field, said laminated cores of the first group being arranged in a row parallel with the direction of travel of the magnetic field;

said laminated cores of the second group being trapezium-



shaped, their lamination being parallel with the direction of travel of the magnetic field;

each of said laminated cores of the first group being provided with at least one slot;

each of said laminated cores of the second group having rods received in said slots of the adjacent laminated cores of the first group;

said concentrated multiphase winding containing a set of coils;

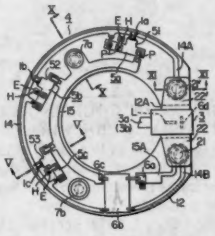
one part of said coils of said concentrated multiphase winding being wound around said rods of said laminated cores of the first group;

the other part of said coils of said concentrated multiphase winding being wound around said yokes of said laminated cores of the second group.

4,232,238
RECTIFIER ASSEMBLY FOR AC GENERATORS FOR USE WITH VEHICLES

Akihiro Saito, and Keigo Naoi, both of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 6, 1979, Ser. No. 17,899
Claims priority, application Japan, Mar. 6, 1978, 53/24520
Int. Cl.³ H02K *11/00*
U.S. Cl. 310—68 D **4 Claims**



1. A rectifier assembly for an AC generator to be mounted in vehicles comprising;

a heat radiating metallic plate of a horseshoe configuration, whose one surface is covered by an insulating layer,

a pair of electrically conductive plates fixed on said insulating layer of said heat radiating plate and spaced from each other to give a space therebetween,

a semiconductor rectifier unit for rectifying an AC output of the AC generator to produce a DC output, said rectifier unit being mounted to said heat radiating plate at the space between said conductive plates,

said rectifier unit including at least one main rectifier element whose output terminal is connected to one of said conductive plates and an auxiliary rectifier element whose output terminal is connected to the other conductive plate, and

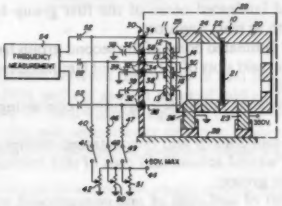
means for fixing said heat radiating plate to the AC generator.

4,232,239

FREQUENCY ADJUSTMENT OF PIEZOELECTRIC RESONATOR UTILIZING LOW ENERGY OXYGEN GLOW DEVICE FOR ANODIZING ELECTRODES

Lawrence N. Dworsky, Coral Springs; Jeffery A. Whalin, Hialeah, and Warren P. Glotzbach, Tamarac, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 16, 1979, Ser. No. 20,909
Int. Cl.³ H01L *41/22*
U.S. Cl. 310—312 **10 Claims**



1. The method of adjusting the frequency response of a piezoelectric resonator device which includes a piezoelectric wafer with a plurality of resonating sections each having an anodizable electrode thereon, and with such electrodes of a plurality of sections being positioned adjacent to each other;

such method including the steps of:

applying oxygen plasma to the adjacent electrodes,

selectively applying direct current potentials to the individual electrodes to cause anodization thereof, and

measuring the frequency response of the resonator device during such anodization of the electrodes.

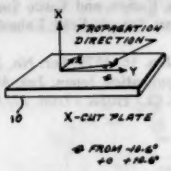
4,232,240

HIGH PIEZOELECTRIC COUPLING X-CUTS OF LEAD POTASSIUM NIOBATE, $PB_2KNB_5O_{15}$, FOR SURFACE ACOUSTIC WAVE APPLICATIONS

Robert M. O'Connell, Arlington, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 31, 1979, Ser. No. 43,982
Int. Cl.³ H01L *41/18*
U.S. Cl. 310—313 A **3 Claims**

1. A lead potassium niobate crystalline substrate member particularly adapted for use in acoustic wave devices which is characterized by having an acoustic wave propagation surface defined by a plane that substantially coincides with the Euler



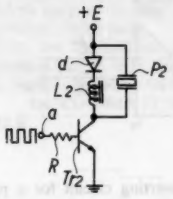
angles Lambda=90.0°, Mu=90.0° and a range of Theta from about −10.6° to −1.0° and from about +0.1° to +10.6°.

4,232,241

ELECTRIC CIRCUIT FOR DRIVING A PIEZOELECTRIC VIBRATOR

Mitsuhiro Hamatani, Tokyo, Japan, assignor to Kabushiki Kaisha Seikosha, Tokyo, Japan

Filed May 24, 1978, Ser. No. 909,309
Claims priority, application Japan, May 26, 1977, 52-67936
Int. Cl.² H01L *41/10*
U.S. Cl. 310—317 **4 Claims**



1. In an electric circuit for driving a piezoelectric vibrator of the type comprising a parallel circuit comprised of a coil connected in parallel with the piezoelectric vibrator with one side of the parallel circuit connected to a voltage supply source and the other side of the parallel circuit connected to a switching means for switching between ON and OFF states in response to pulse signals applied thereto to thereby apply driving forces to said piezoelectric vibrator; the improvement comprising means including a diode connected in series with said coil such that the series-connected diode and coil are in parallel with said piezoelectric vibrator for applying the reverse induced voltage produced in said coil during the OFF states of said switching means to said piezoelectric vibrator to thereby apply driving forces of greater magnitude to said piezoelectric vibrator than would otherwise occur without said diode.

4,232,242

SPARKING PLUG WITH EFFICIENT AIR SUPPLYING SYSTEM AND A REMOVABLE SITTING DEVICE

Yun T. Hsu, 30-27, Chun In Rd., Chun In Village, Tong Sun Hsiang, I Lan Hsien, Taiwan

Filed Aug. 7, 1978, Ser. No. 931,727
Int. Cl.³ H01T *13/02, 13/06*
U.S. Cl. 313—120 **6 Claims**

1. A spark plug comprising:

a central ceramic insulator holding an electrode; said electrode extending to an end terminal;

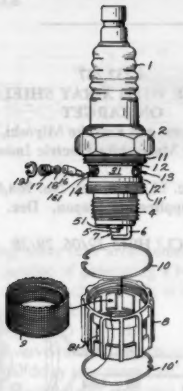
a medium body portion surrounding said insulator; an annular air tunnel terminating at said end terminal being formed between said medium body portion and said insulator;

a protection sheath surrounding said medium body portion so as to form an annular air chamber between said sheath

and said medium body portion, said sheath having openings therein for receiving air into said chamber;

a plurality of holes formed in said medium body portion each extending from said air chamber to said tunnel;

a cylindrical mesh filter within said protection sheath for filtering air to said plurality of holes; and



a plurality of unidirectional flow inlet valves, one each received in each of said holes for directing air flow between said chamber and said tunnel toward said end terminal.

4,232,243

HIGH PRESSURE ELECTRIC DISCHARGE LAMP

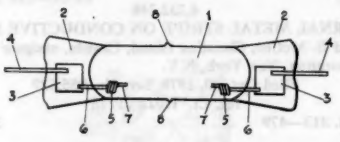
Sydney A. R. Rigden, Hemel Hempstead, England, assignor to The General Electric Company Limited, London, England

Continuation-in-part of Ser. No. 839,654, Oct. 5, 1977, abandoned. This application Apr. 26, 1979, Ser. No. 33,437

Claims priority, application United Kingdom, Oct. 19, 1976, 43310/76; Dec. 20, 1976, 53088/76

Int. Cl.[2] H01J *61/073, 61/09, 61/18*

U.S. Cl. 313—217 **10 Claims**



1. In a high pressure electric discharge lamp including a discharge envelope which contains a filling consisting of mercury, rare gas, and at least two metal halides which are vaporizable at the operating temperature of the lamp, and which has mounted within it a pair of tungsten electrodes between which an electric discharge passes through the filling in operation of the lamp, each said electrode being attached to an electrically conducting lead extending to the exterior of the discharge envelope and connected to a terminal carried by an outer envelope of light-transmissive vitreous material in which the discharge envelope is enclosed, the improvement consisting of, in combination,

the incorporation within a cavity in the structure of each said electrode of a quantity of activator material consisting essentially of scandium oxide, the said activator material being in the form of a solidified melt substantially filling the said cavity and adherent to the electrode structure, and

the provision in the discharge envelope of said filling in which the metal halides consist of at least one metal iodide and at least one metal bromide, including at least one member of the group consisting of scandium iodide and scandium bromide, in relative proportions such that the percentage atomic ratio of the total amount of bromine to the total amount of iodine in said metal halides is in the range of 20:80 to 60:40.

4,232,244

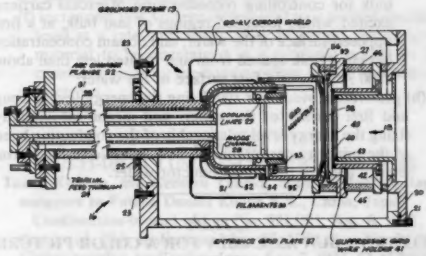
COMPACT, MAINTAINABLE 80-KEV NEUTRAL BEAM MODULE

Joel H. Fink, and Arthur W. Molvik, both of Livermore, Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 25, 1978, Ser. No. 954,679

Int. Cl.[3] H05H *1/00*

U.S. Cl. 313—363 **9 Claims**



1. In a neutral beam module comprising at least an ion source, an ion accelerator, an isolation valve, and a neutralizer positioned within a housing defining a vacuum wall and having at least one magnetic shield positioned in and adjacent said housing, the improvement comprising: an electrically grounded frame removably secured within one end of said housing, said ion accelerator and said ion source being aligned with one another and with each being removably mounted within said grounded frame, and means located within said grounded frame for reducing long-path breakdown, said means including at least one gradient shield means surrouding at least said ion source and positioned substantially midway between said ion source and said grounded frame, said ion source and said ion accelerator being immersed in a vacuum.

4,232,245

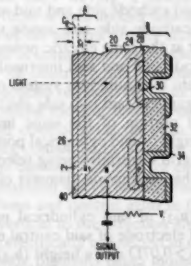
REDUCED BLOOMING DEVICES

Eugene D. Savoye, Lancaster; Thomas W. Edwards, Mt. Joy, and Lloyd F. Wallace, Coatsville, all of Pa., assignors to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 620,750, Oct. 8, 1975, abandoned. This application Oct. 3, 1977, Ser. No. 838,713

Int. Cl.[3] H01J *29/44*

U.S. Cl. 313—367 **12 Claims**



1. A charge storage device having a signal sensing element

with an input signal sensing surface region and a charge storage region, and reading means for selectively contacting portions of said charge storage region, and sensing element comprising:

(a) a single crystal semiconductor wafer having

(1) a plurality of discrete storage regions along a second surface and extending into said wafer a distance less than the wafer thickness, said discrete regions being of a first conductivity type;

(2) a bulk region in said wafer defined as a region extending between and bounded at opposite sides by said discrete regions and said signal sensing surface region; said bulk region being of a second conductivity type;

(3) means for controlling blooming within said signal sensing surface region comprising a region of similar conductivity type to that associated with said bulk, and having a dopant concentration exceeding that of said bulk for controlling recombination of excess carriers, excited within localized regions of said bulk, at a first opposed surface of the wafer; said dopant concentration having a peak spaced from and located less than about 1500 A from said first surface of the wafer;

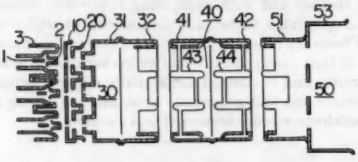
(b) passivation means for stabilizing the energy levels along said first surface of the wafer; said means substantially fixing the energy level relationship of the conducting band of the minority carriers in the bulk relative to the Fermi energy level of the semiconductor wafer.

4,232,246

ELECTRON GUN ASSEMBLY FOR A COLOR PICTURE TUBE

Soichi Sakurai, Mobara; Kunio Ando, Yokohama, and Kenichi Fukuzawa, Mobara, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 15, 1978, Ser. No. 877,862
Claims priority, application Japan, May 25, 1977, 52/59766
Int. Cl.³ H01J *29/50*
U.S. Cl. 313—414 **5 Claims**



1. An electron gun assembly for a color picture tube comprising:

two side electron guns and a central electron gun sandwiched spacedly between said two side electron guns in an in-line relation; each of said central and said two side electron guns including a main focussing lens system comprised of a cathode side grid electrode, an anode side grid electrode and an intermediate grid electrode provided between said cathode side and said anode side grid electrodes, said cathode side and anode side grid electrodes being kept at the same electric potential; said cathode side, said anode side and said intermediate grid electrodes of said main focussing lens system of each of said central electron gun and said two side electron guns having a cylindrical portion of the same inside diameter, respectively; a height of said cylindrical portion of each of the intermediate grid electrodes being selected to be substantially larger than said inside diameter of said cylindrical portion,

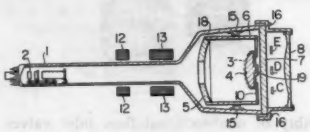
wherein a height (h_{c3}) of said cylindrical portion of said cathode side grid electrode of said central electron gun is selected to be $h_{c3} > 0.07D$ and a height (h_{s3}) of said cylindrical portion of said cathode side grid electrode of each of said two side electron guns is selected to be $h_{s3} > 0.41D$, where D is the inside diameter of the cylindrical portion, and further wherein said cathode side grid electrodes of said central and said two side electron guns are integrally formed only by means of a single cap electrode, without an inner electrode coupled to the cap electrode, so that the heights h_{c3} and h_{s3} are formed entirely by the cap electrode.

4,232,247

PROJECTION TUBE WITH X-RAY SHIELDING MEANS ON TARGET

Matsuo Ochi, Neyagawa, and Keisuke Miyoshi, Katano, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 11, 1978, Ser. No. 968,408
Claims priority, application Japan, Dec. 12, 1977, 52-167312[U]
Int. Cl.³ H01J *29/06, 29/28*
U.S. Cl. 313—474 **3 Claims**



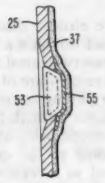
1. A projection tube comprising: means for producing an electron beam; means for focussing and deflecting said electron beam; a target having a fluorescent screen disposed to be irradiated with said electron beam; X-ray shielding means disposed to cover an entire back surface and entire peripheral surfaces of said target without obstructing said fluorescent screen; a concave mirror disposed to project forward light emitted from said fluorescent screen; and means disposed to correct the light projected by said concave mirror.

4,232,248

INTERNAL METAL STRIPE ON CONDUCTIVE LAYER

Bernard B. McCue, Christian Island, Canada, assignor to RCA Corporation, New York, N.Y.

Filed Oct. 30, 1978, Ser. No. 955,627
Int. Cl.³ H01J *29/18*
U.S. Cl. 313—479 **3 Claims**

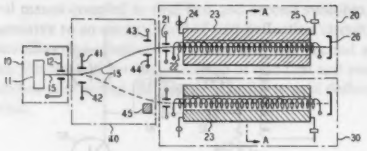


1. A cathode-ray tube comprising an evacuated glass envelope including a funnel, a neck integral with said funnel, a faceplate sealed to said funnel, and a luminescent layer on the interior surface of said faceplate, a conductive layer adhered to at least a portion of the interior surface of said envelope, a conductive metal body attached to said interior envelope surface, and a conductive coating contacting both said layer and said metal body, said conductive coating consisting essentially of tin metal and about 2 to 5 weight percent of denitrified glass.

4,232,249
BEAM-SWITCHED TRAVELING WAVE TUBE

Dietrich A. Alsberg, Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sep. 28, 1978, Ser. No. 946,661
Int. Cl.[2] H01J *25/34*
U.S. Cl. 315—3.6 8 Claims

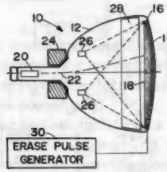


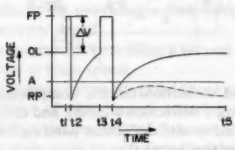
1. A traveling wave tube arrangement comprising an electron (10) gun capable of generating a beam (15) of electrons,
a first delay structure (20) capable of receiving and modulating the beam of electrons,
CHARACTERIZED IN THAT
the traveling wave tube arrangement further comprises
n−1 additional delay structures (30), where n is greater than 1, each additional delay structure being disposed so as to be capable of receiving and modulating the beam of electrons; and
deflecting means (40) disposed between the electron gun and the n delay structures, said deflecting means selectively deflecting the beam of electrons to any one of the n delay structures.

4,232,250
NO-FLASH ERASE OF DIRECT VIEWING BISTABLE STORAGE CRT

Mark A. Richards, Pasadena, Calif., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Apr. 19, 1979, Ser. No. 31,676
Int. Cl.[3] H01J *29/50, 31/00*
U.S. Cl. 315—13 ST 9 Claims



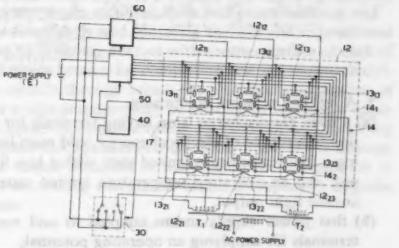


1. The method of erasing a charge image stored by a dielectric material provided on a target electrode in a bistable storage tube, which image is being maintained in a stored condition by bombardment of the dielectric material with low velocity electrons from a source thereof, said method comprising the subsequential steps of:
(a) increasing the voltage differential between said electron source and target electrode from a normal operating level to a selected higher, fade positive level sufficiently rapidly to raise the potential of the non-image areas of the dielectric material above the first crossover point on the secondary emission curve for the material,
(b) maintaining said voltage differential at said higher level for a first time period not longer than about ten milliseconds,
(c) reducing said voltage differential to a selected lower level sufficiently rapidly to lower the potential of said dielectric material below said first crossover point,
(d) increasing said voltage differential to a normal operating level over a second time period,
(e) repeating steps (a), (b) and (c), and
(f) increasing said voltage differential to a normal operating level at a rate sufficiently slow to permit the dielectric material to be maintained at a potential below its first crossover point by the bombardment of said low velocity electrons.

4,232,251
MULTI-DIGIT LUMINESCENT DISPLAY TUBE

Takao Kishino, and Gentaro Tanaka, both of Mobara, Japan, assignors to Futaba Denshi Kogyo K.K., Chiba, Japan

Continuation-in-part of Ser. No. 831,083, Sep. 6, 1977, abandoned. This application Mar. 27, 1979, Ser. No. 24,261
Claims priority, application Japan, Sep. 3, 1976, 51-117701[U]
Int. Cl.[2] H01J *63/06;* H05B *41/14*
U.S. Cl. 315—167 5 Claims



1. A multi-digit luminescent display tube comprising:
a vacuum container;
a plurality of pattern display sections arranged in the form of a matrix composed of a plurality of rows and columns and adapted to luminescently display a plurality of patterns such as characters and numerals, said pattern display sections being contained in said vacuum container, each of said pattern display sections being composed of a plurality of anodes each having a luminescent material layer thereon, those of said anodes which form the corresponding parts of the pattern display sections being electrically connected in common to each other;
a plurality of control grids provided above said pattern display sections respectively so as to accelerate and control thermions moving toward said pattern display sections, said control grids on each column or row being electrically connected in common to each other;
a plurality of cathode filaments for emitting thermions when heated provided above and opposite to said pattern display sections and control grids in the direction of row or column vertical to the direction along which said control grids are electrically connected in common to each other, said cathode filaments being independently connected to respective power supplies for heating;
a filament control circuit for switching electric potential of each of said power supplies either to a positive or negative

potential with respect to electric potential of a power supply for driving said pattern display sections and control grids synchronously with the scanning of the control grids; and

a plurality of shield means provided midway between the rows or columns of the matrix of said pattern display sections in the direction along which said cathode filaments are arranged for preventing thermions emitted from said cathode filaments from being accelerated by the action of control grids not below and opposite thereto, whereby thermions emitted from a selected cathode filament impinge only on a pattern display section corresponding thereto.

4,232,252

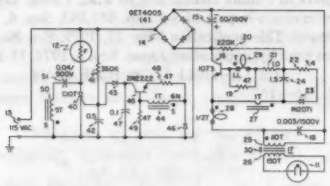
LIGHTING NETWORK INCLUDING A GAS DISCHARGE LAMP AND STANDBY LAMP

William Peil, North Syracuse, N.Y., assignor to General Electric Company, Syracuse, N.Y.

Continuation-in-part of Ser. No. 909,300, May 24, 1978, abandoned. This application Apr. 13, 1979, Ser. No. 29,954

Int. Cl.³ H05B *41/46*

U.S. Cl. 315—92 **15 Claims**



1. A lighting network comprising:

(a) a main gas discharge lamp having terminals for connection to a source of electrical energy, said main lamp having a low temperature ignited state with a low light output; and an operating temperature ignited state with a normal light output,

(b) first power supply means coupled to said main lamp terminals for supplying an operating potential;

said lamp potential, when connected to said power supply means, being low at said low temperature ignited state and normal at said operating temperature ignited state,

(c) a standby lamp for use when said main lamp is below normal light output,

(d) a second power supply means for operating said standby lamp, and

(e) control means including:

(1) an amplitude discriminator comprising a transistor amplifier exhibiting cut-off at a low input range and active operation with input inversion at a higher input range to effect a transfer characteristic in which electrical inputs in said low and higher ranges respectively, produce an output quantity in respectively a first range and a second range distinct from said first range,

(2) means coupling a voltage proportional to said main lamp voltage to said discriminator to effect amplifier cut-off when said main lamp is in the low voltage, low temperature ignited state, and active input inversion when said main lamp is in the normal voltage, operating temperature ignited state, and

(3) switching means coupled to the output of said discriminator for applying power from said first power supply means to said standby lamp for amplitude discriminator outputs in said first range and for removing power for outputs in said second range.

4,232,253

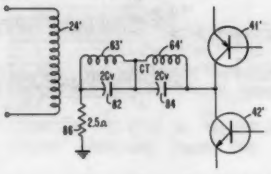
DISTORTION CORRECTION IN ELECTROMAGNETIC DEFLECTION YOKES

Joost Mortelmans, Campbell, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1977, Ser. No. 863,654

Int. Cl.³ H01J *29/56*

U.S. Cl. 315—370 **16 Claims**



9. An electromagnetic deflection yoke for correcting cross coupling distortion comprising

one winding arranged in said yoke for deflection in a given direction,

another winding arranged in said yoke for the complementary direction of deflection;

the arrangement of said windings resulting in a capacitor existing therebetween,

a capacitor connected in series with said one winding and a source of deflection voltage wave, and

another capacitor shunted across said source of deflection voltage wave,

the sum of the capacitances of said capacitors being equal to said existing capacitance between said one winding and said other winding of the deflection yoke.

4,232,254

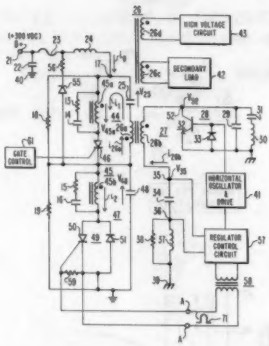
REGULATED DEFLECTION CIRCUIT

Peter E. Haferl, Adliswil, Switzerland, assignor to RCA Corporation, New York, N.Y.

Filed Nov. 29, 1978, Ser. No. 964,538

Int. Cl.³ H01J *29/70*

U.S. Cl. 315—408 **13 Claims**



1. A regulated deflection circuit, comprising: a deflection circuit comprising a deflection winding and deflection switching means coupled to said deflection winding for forming first and second deflection intervals;

first and second resonant energy circuits;

supply means coupled to said first and second resonant energy circuits for storing energy in said first and second resonant energy circuits;

deflection circuit energy transfer means coupled to said deflection circuit and to at least one of said first and sec-

ond resonant energy circuits for transferring energy to said deflection circuit;

first means coupled to said first and second resonant circuits for transferring energy between said first and second resonant circuits;

first and second switches coupled respectively to said first and second resonant circuits for generating resonant oscillations in said first and second resonant circuits; and

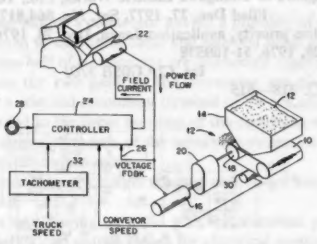
control means coupled to said first and second switches and responsive to an energy level of said deflection circuit, for controlling the conduction of said first and second switches, the conduction angle overlap of said first and second switches controlling the energy transfer to said deflection circuit.

4,232,255

DELIVERY CONTROL SYSTEM FOR VEHICLE-MOUNTED SPREADER

Eric T. Carlen, R.R. #1, Wirtz, Va. 24184

Filed Nov. 6, 1978, Ser. No. 957,729
Int. Cl.³ H02P 5/20
U.S. Cl. 318—143 **7 Claims**



1. An electrical control system for regulating the rate of delivery of bulk material by a moving vehicle having a supply hopper and a conveyor device communicating with the hopper, said system comprising:

a conveyor drive system including a direct current drive motor;

an electrical generator for providing electrical power to said direct current motor, said generator being mechanically driven by the vehicle engine and having a negative feedback loop connected at its output;

a first transducer for providing a first voltage proportional to the conveyor speed;

a second transducer for providing a second voltage proportional to the vehicle speed;

manually adjustable means for providing a reference voltage representative of the desired material delivery rate in weight of material per unit of distance;

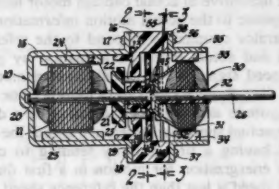
a controller connected to said first transducer, said second transducer, said manually adjustable means and the negative feedback loop of said electrical generator and responsive to the voltages produced thereby to control the generator field current to cause said drive motor to drive the conveyor at the speed required for the desired material delivery rate.

4,232,256

UNITARY ELECTRIC MOTOR AND BI-DIRECTIONAL CONTROLLER ARRANGEMENT

Leonard E. Moriconi, Southfield, and Yoshitaka Yosbida, Warren, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 28, 1978, Ser. No. 946,503
Int. Cl.³ H02P 3/00
U.S. Cl. 318—292 **3 Claims**



1. A unitary electric motor and bi-directional controller arrangement comprising:

an electric motor having an armature electrically energizable through a commutator, a pair of brushes each having a surface in sliding contact with said commutator and a housing including means for rotatably supporting said armature;

electrically energizable means of the type having an operating member that may be actuated through selected opposite first and second directions of travel relative to a normal neutral position in response to the electrical energization of said electrically energizable means in respective opposite senses mounted upon said motor housing; and

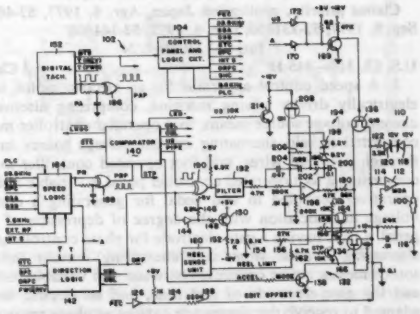
means actuated by said operating member and so positioned as to be in sliding contact with another surface of each of said motor brushes for completing first and second electrical circuits through which the electrical energization of said motor armature may be effected in respective opposite senses in response to the operation of said operating member through said first direction of travel and through said second direction of travel upon the energization of said electrically energizable means in responsive opposite senses.

4,232,257

WEB TRANSPORT CAPSTAN CONTROL SYSTEM

Robert P. Harshberger, Jr., San Jose, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed May 3, 1976, Ser. No. 682,849
Int. Cl.³ H02P 5/16
U.S. Cl. 318—314 **52 Claims**



1. In a bidirectional web transport system having a web storage system disposed to supply and take up a length of web

member moving along a web path, a single capstan positioned along the web path to engage and control the motion of a length of web member extending along the web path, a capstan motor coupled to drive the capstan, a tachometer coupled to sense capstan motor motion and generate actual motion information indicative of the speed and direction thereof and a reference motion signal generator generating a reference motion signal indicative of a commanded capstan motor reference speed, the improvement comprising:

a direction indicator circuit coupled to generate a direction signal indicative of actual capstan motor motion direction in response to the actual motion information;

a comparator coupled to respond to the reference motion signal and actual motion information by generating an overspeed signal when actual capstan motor speed exceeds the reference speed and a motion error signal having a magnitude and polarity indicative of a difference between actual speed and reference speed, the motion error signal having a first polarity tending to cause capstan motor energization for motion in a first direction when actual speed is less than the reference speed and having a second polarity opposite the first polarity tending to cause capstan motor energization for motion in a second direction opposite the first direction when actual speed is greater than the reference speed;

an inverter circuit coupled to receive and selectively invert the motion error signal in response to actual motion information and motion command information, the motion error signal having a first state of inversion when actual capstan motor motion is in the second direction and actual speed is greater than a commanded reference speed or when commanded capstan motor motion is in the second direction and actual capstan motor speed is not greater than a commanded reference motor speed or when motion stop is commanded and actual capstan motor motion is in the first direction, the motion error signal having a second state of inversion opposite the first state when actual capstan motor motion is in the second direction and actual speed is greater than a commanded reference speed, or when a commanded capstan motor motion is in the first direction and actual capstan motor speed is not greater than a commanded reference motor speed or when motion stop is commanded and actual capstan motor is in the second direction; and

a motor drive circuit coupled to energize the capstan motor in accordance with the magnitude and polarity of the motion error signal as selectively inverted by the inverter circuit.

4,232,258

SPEED CONTROL APPARATUS FOR ELECTRIC MOTOR

Nobuyoshi Matsumura, Yao, Japan, assignor to Maruzen Sewing Machine Co., Ltd, Moriguchi, Japan

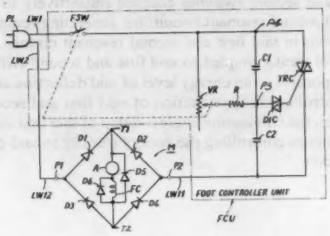
Filed Mar. 20, 1978, Ser. No. 888,404

Claims priority, application Japan, Apr. 6, 1977, 52-40158; Sep. 9, 1977, 52-131550; Dec. 1, 1977, 52-144808

Int. Cl.[2] H02P *7/24*

U.S. Cl. 318—345 H **3 Claims**

1. A speed control apparatus for an electric motor in an electrically driven sewing machine, comprising alternating current voltage source means, foot operated controller means connected to said alternating current voltage source means through two lead wires, said foot operated controller means comprising a foot operated controller pedal, a variable resistor operatively coupled to said pedal for generating a control voltage in association with the degree of depression of said pedal, a triac having a gate electrode for phase controlling the alternating current from said alternating current voltage source means, a diac connected between said variable resistor and the gate electrode of said triac, and an electric motor adapted to receive the alternating current as phase controlled through said lead wires from said foot operated controller means, said foot controller means further comprising capacitor means connected in parallel with said variable resistor, said capacitor means comprising first and second capacitors connected in series and across said triac, the junction of said first and second capacitors being connected to said diac, whereby



said capacitor means is discharged when the induced voltage across the electric motor becomes decreased so as to supply the discharging electric charge to said diac, thereby to increase the conduction angle of said triac.

4,232,259

SERVO-SYSTEM

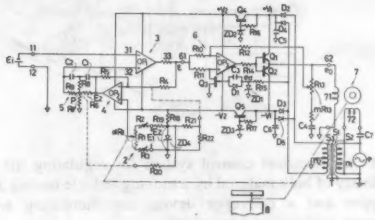
Nobuo Kaieda, and Yoshihiro Okano, both of Musashino, Japan, assignors to Yokogawa Electric Works, Ltd., Tokyo, Japan

Filed Dec. 27, 1977, Ser. No. 864,817

Claims priority, application Japan, Dec. 28, 1976, 51-160537; Dec. 28, 1976, 51-160538

Int. Cl.[3] G05B *5/01*

U.S. Cl. 318—615 **15 Claims**



1. A servo-system responsive to a dc input signal comprising:

a high-gain direct-coupled differential dc amplifier having said dc input signal as one input thereto,

comparison signal generating means for generating a comparison signal,

an adder for adding the output of said dc amplifier to said comparison signal,

a filter circuit for filtering the output of said adder and for applying the filtered output as a second input to said dc amplifier,

a servo-motor,

a servo-amplifier connected between said dc amplifier and said servo-motor for driving said servo-motor in accordance with the differential output of said dc amplifier, and

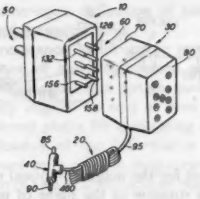
coupling means for coupling said comparison signal generating means to said servo-motor to vary said comparison signal in accordance with displacement of said servo-motor to zero-balance the output of said direct-coupled dc amplifier.

4,232,260

UNIVERSAL BATTERY CHARGER/ADAPTER UNIT

Fred M. Lambkin, 462 N. Morgan, Chicago, Ill. 60622

Filed Apr. 19, 1978, Ser. No. 897,938
Int. Cl.³ H01M 10/46; H01F 27/00
U.S. Cl. 320—2 4 Claims



1. An improved power unit which includes a transformer with a secondary having multiple taps, a rectifier means and a first one-half of a connector having a plurality of pins, the secondary taps are connected to selected pins on the one-half of a connector, the improvement comprising:

an input terminal and output terminals for the rectifier means are connected to other pins on the first one-half of a connector;

a second one-half of a connector having a plurality of plugs is connected to an output cable and selected plugs of said second one-half of a connector are connected together so that when the two parts of the connector are plugged together a selected secondary terminal of the transformer is connected to the input terminal of the rectifying means and the output terminals of the rectifying means are connected to the output cable.

3. A universal battery charger adapter unit comprising:

a power unit;

said power unit having an input port for electrical power and a plurality of output means for electrical power;

said power unit containing a means for electrical conversion operably connected to said input port and said plurality of output means so as to provide a plurality of output voltages, a selected one of which is applied to a member of said plurality of output means, when a selected voltage is applied to said input port;

a means for electrical connection including a cable for transmission of electrical energy;

said cable being connectable at a first end to said plurality of output means as well as

connected at a second end to a battery nest for charging rechargeable batteries and operable to connect selected members of said plurality of output means so as to apply a selected output voltage to said battery nest;

said battery nest having means whereby a plurality of variable size batteries may be simultaneously charged;

said means whereby a plurality of variable size batteries may be simultaneously charged comprising at least one shim insertable into said battery nest and operable to compensate for the varying physical dimensions of a corresponding member of the plurality of variable size batteries being charged; and

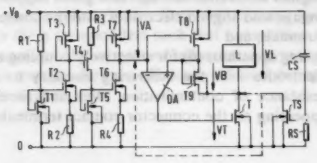
wherein said shim includes an electrical means operable to limit the charging rate of a corresponding member of the plurality of variable size batteries being charged.

4,232,261

MOS CONTROL CIRCUIT FOR INTEGRATED CIRCUITS

Ernst Lingstaedt, Munich; Gerhard Moegen, Baldham, and Gottfried Wotruba, Poing, all of Fed. Rep. of Germany, assignors to Eurosil GmbH, Munich, Fed. Rep. of Germany

Filed Jan. 30, 1978, Ser. No. 873,359
Claims priority, application Fed. Rep. of Germany, Feb. 24, 1977, 2708021
Int. Cl.³ G05F 1/56
U.S. Cl. 323—22 R 12 Claims



1. An integrated CMOS circuit for controlling input voltage to an integrated CMOS load so as to have a value of a reference voltage including a MOS field-effect control transistor connected in series with said load across a power supply and a differential amplifier having an output connected to the gate of said control transistor, characterized by

a first and a second reference voltage source defining together said reference voltage and being connected in series with the voltage between inputs of said differential amplifier and with said load in a closed loop connection whereby said input voltage to said load is dependent upon the sum of said reference voltages,

said reference voltages corresponding to the threshold voltages of MOS field-effect transistors in said integrated CMOS load, and

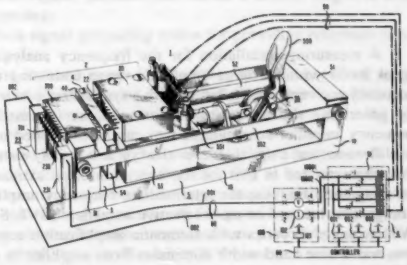
said reference voltage sources including saturated MOS field-effect transistors which are complementary to each other.

4,232,262

CONNECTOR CONTACT TERMINAL CONTAMINATION PROBE

George C. Emo, 743 Jonsol Ct., Gahanna, Ohio 43230, and Thomas G. Grau, 24 Dogwood Dr., Mendam Township, Morris Township, N.J. 07960

Filed Oct. 12, 1978, Ser. No. 950,724
Int. Cl.³ G01R 31/04, 27/02, 1/067
U.S. Cl. 324—65 P 18 Claims



1. Apparatus for testing connectors, said apparatus having circuitry (100) for measuring electrical resistance; and testing apparatus (1) for coupling said measuring circuitry to contact terminals (701) of a connector (700)

CHARACTERIZED IN THAT

said testing apparatus comprises

electrode apparatus (2, 4) having electrodes (221, 230) for engaging the connector contact terminals, said electrode apparatus having a probe assembly (20) for mounting ones of said electrodes and a guide support member (40) for slidably supporting said mounting electrodes;

support apparatus (3) for receiving a connector and holding the connector in a fixed relationship with said electrode apparatus;

positioning apparatus (5) for enabling said guide support member to align said one electrodes with the connector contact terminals and said probe assembly to extend said aligned electrodes through said guide support member to engage said aligned electrodes with the connector contact terminals; and

coupling apparatus (6) for selectively coupling said engaged electrodes with the measuring circuitry to measure the resistance of contamination films and foreign material appearing on the connector contact terminals.

4,232,263

MEASURING INSTALLATION FOR FREQUENCY ANALYSIS OF SIGNAL LEVELS WITHIN A LARGE AMPLITUDE RANGE

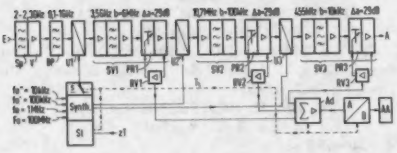
Theodor Schwierz, Klingen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Dec. 19, 1978, Ser. No. 971,006

Claims priority, application Fed. Rep. of Germany, Dec. 27, 1977, 2758154

Int. Cl.³ G01R *23/16*

U.S. Cl. 324—77 B **7 Claims**



1. A measuring installation for the frequency analysis of signal levels within a large amplitude range consisting of a frequency conversion installation with a synthesizer controllably generating the conversion frequencies, an intermediate frequency amplifier arrangement that can be controlled in its amplification, and a signal level evaluation and display installation, characterized in that for the execution of an extremely fast frequency analysis, the intermediate frequency amplifier arrangement has two or more selective amplifiers (SV1, SV2, SV3) arranged in series with automatic amplification regulation, and whose band width diminishes from amplifier to amplifier in the direction of the path of the received signal level to be amplified; and the regulating variables occurring at the individual amplifiers SV1, SV2 and SV3 are summed with consideration of the prescribed regulating characteristics in an adder (Ad); and the sum value is delivered from the output of the adder Ad to the signal level evaluation and display installation (AA).

4,232,264

ARRANGEMENT FOR THE MAGNETO-OPTICAL MEASUREMENT OF CURRENTS

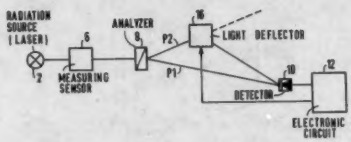
Alfred Papp, and Hauke Harms, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Dec. 18, 1978, Ser. No. 970,351

Claims priority, application Fed. Rep. of Germany, Dec. 29, 1977, 2758611

Int. Cl.² G01R *31/02, 33/02*

U.S. Cl. 324—96 **4 Claims**



1. An arrangement for the magneto-optical measurement of currents, utilizing a rotation of the plane of polarization of a linearly polarized light beam which is dependent on the current to be measured comprising:

(a) a radiation source developing a linearly polarized light beam;

(b) a measuring sensor adapted to be disposed at a conductor carrying the current to be measured, having said beam as an input and providing an output beam whose plane of polarization has been rotated in dependence on the current being measured;

(c) an analyzer interposed in said output beam for splitting said beam into two partial beams having orthogonal directions of polarization;

(d) a detector arranged so that one of said partial beams is incident thereon;

(e) a light deflector interposed in the other of said partial beams and adapted to alternatingly, at a high frequency, pass said other partial beam and direct said other partial beam to be incident on said detector; and

(f) electronic circuit means receiving at the high frequency of said light deflector first and second output signals from said detector dependent respectively on said one partial beam and said both partial beams for combining said signals to eliminate the noise component of the measurement signal.

4,232,265

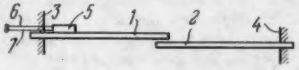
DEVICE FOR MEASURING INTENSITY OF MAGNETIC OR ELECTROMAGNETIC FIELDS USING STRAIN GAUGES MOUNTED ON FERROMAGNETIC PLATES

Vladimir A. Smirnov, ulitsa Lavochkina, 52, kv. 208, Moscow, U.S.S.R.

Filed Apr. 17, 1978, Ser. No. 897,746

Int. Cl.³ G01R *33/02, 19/00*

U.S. Cl. 324—260 **8 Claims**



1. A device for measuring the intensity of a magnetic or electromagnetic field produced by a field source comprising:

a first elongate flat plate formed of a ferromagnetic material having first and second end portions, said first end portion thereof being rigidly fixed to a first support member so that said first plate extends from said first support member in a cantilevered manner;

a second elongate flat plate formed of a ferromagnetic material having respective first and second end portions, said first end portion thereof being rigidly fixed to a second

support member so that said second plate extends from said second support member in a cantilevered manner, said second end portion of said first plate being located in spaced opposed relationship to said second end portion of said second plate to define a gap therebetween, said first and second plates forming a flux path for said field source;

at least one of either said first and second plates and first and second support members comprising a deformation section in the region immediately proximate to the respective points at which said first and second plates are rigidly fixed to said first and second support members, respectively, said at least one deformation section being subject to deformation upon deflection of said first and second plates by said magnetic field;

at least one resistance strain gauge means mounted on a respective one of said deformation sections and said at least one resistance strain gauge means having an axis appropriately aligned on said at least one of either said first and second plates for generating an electrical signal output indicative of the deformation of said deformed section caused by a relative displacement of said second end portions of said first and second plates upon deflection thereof; and

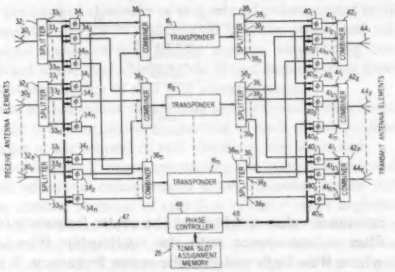
a measuring circuit coupled to said at least one strain gauge means for measuring the electrical signal output thereof.

4,232,266

TECHNIQUE FOR SHARING A PLURALITY OF TRANSPONDERS AMONG A SAME OR LARGER NUMBER OF CHANNELS

Anthony Acampora, Freehold, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sep. 5, 1978, Ser. No. 939,180
Int. Cl.[2] H04J *3/06*
U.S. Cl. 370—79 **10 Claims**



1. An on-board satellite switching subsystem comprising:

first antenna means (**12_1–12_n**, FIG. 1; **30_1–30_p**, FIG. 2) capable of receiving during a frame period bursts of information in a time division multiplexed (TDM) mode from each of a plurality of m ground areas destined for either one of the same and other ones of said ground areas;

second antenna means (**20_1–20_n**, FIG. 1; **44_1–44_p**, FIG. 2) capable of transmitting the bursts of information received by said first antenna means toward the destined ground areas; and

switching means (**14**, **16_1–16_n**, **18**, **22**, FIG. 1; **16_1–16_n**, **34_1–34_n**, **40_1–40_n**, **46**, FIG. 2) capable of selectively transferring the received bursts of information between the first and second antenna means for appropriate transmission to the destined ground areas

CHARACTERIZED IN THAT

the switching means comprises

a plurality of n transponders (**16_1–16_n**), where $n \leqq m$;

first directing means (**14**, FIG. 1; **34_1–34_n**, FIG. 2) capable of selectively routing n concurrently received bursts of information from the m ground areas to separate ones of the n transponders;

second directing means (**18**, FIG. 1; **40_1–40_n**, FIG. 2) capable of selectively routing said n concurrent bursts of information from the n transponders to the second antenna means to permit appropriate transmission of said n bursts of information to the n of m destined ground areas; and

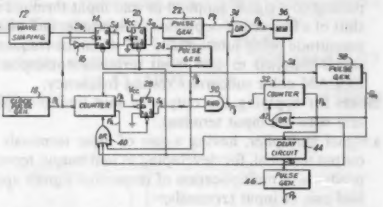
a controller (**22**, FIG. 1; **46**, FIG. 2) coupled to the first and second directing means capable of generating a predetermined repetitive sequence of control signals which are capable of causing the selective routing of the n currently received bursts of information in each portion of the repetitive sequence through the first and second directing means to the n transponders such that nonuniform traffic requirements of the m ground areas are accommodated and the n transponders are efficiently utilized during each repetitive sequence.

4,232,267

DIGITAL SIGNAL SELECTIVE CIRCUIT

Hidemitsu Hanajima, Atsugi, and Yasuo Shigeta, Yokohama, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 25, 1978, Ser. No. 909,392
Claims priority, application Japan, Jun. 1, 1977, 52-63256
Int. Cl.[2] H03K *5/153, 13/00, 9/06*
U.S. Cl. 328—138 **20 Claims**



1. A digital signal selective circuit responsive to a periodic input signal having an operating characteristic occurring at a desired regular periodic interval for a desired length of time, comprising:

clock signal generating means for providing reference clock pulses;

first counting means for counting said reference clock pulses and for registering a resulting count therein which provides a measurement of the length of time since the last occurrence of said operating characteristic;

means for providing an output pulse in response to said operating characteristic occurring at a time when said count in said first counting means is within a predetermined range, said means for providing an output pulse including bistable circuit means providing a predetermined signal level whenever the count in said first counting means is within said predetermined range, and logic circuit means providing an output pulse in response to the simultaneous occurrence of said predetermined signal level and said operating characteristic; and

second counting means for counting each said output pulse and providing an output signal when said second counting means attains a predetermined count.

4,232,268

SECAM CHROMA DEMODULATOR CIRCUIT

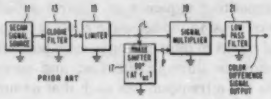
Werner Hinn, Zollikerberg, Switzerland, assignor to RCA Corporation, New York, N.Y.

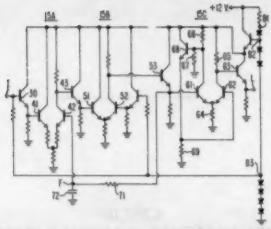
Filed Jan. 12, 1979, Ser. No. 3,028

Claims priority, application United Kingdom, Jan. 18, 1978, 02067/78

Int. Cl.² H03D *3/14*

U.S. Cl. 329—103 **8 Claims**





1. In apparatus for recovering color-difference signal information from a chrominance signal encoded in SECAM fashion but undesirably subject to variations in amplitude over a given range, the combination of:

a multi-stage limiter-amplifier responsive to said chrominance signal;

a phase-shifting network having an input terminal for imparting to a signal supplied to said input terminal a phase shift of a frequency-dependent magnitude, said phase-shift magnitude being substantially 90° when the frequency of a signal supplied to said input terminal corresponds to a SECAM color subcarrier resting frequency;

means for applying the output of said limiter-amplifier to said network input terminal;

a signal multiplier, having a pair of input terminals and an output terminal, for developing at said output terminal the products of multiplication of respective signals applied to said pair of input terminals;

means for applying the output of said limiter-amplifier to one of said signal multiplier input terminals;

means for applying the output of said phase-shifting network to the other of said signal multiplier input terminals; and

low pass filter means coupled to said signal multiplier output terminal for developing a color-difference signal output;

wherein one of the stages of said multi-stage limiter-amplifier includes means for providing said one amplifier stage with a hysteresis characteristic of a form ensuring development by said limiter-amplifier of an output signal with a rectangular wave-shape possessing rise and fall times which are substantially independent of amplitude variations of the signal input to said limiter-amplifier over said given range.

4,232,269

DIGITALLY PROGRAMMABLE ACTIVE RC BANDPASS FILTER WITH CONSTANT ABSOLUTE BANDWIDTH

Gideon Willoner, North Vancouver, Canada, assignor to GTE Lenkurt Electric (Canada) Ltd., Burnaby, Canada

Filed Aug. 25, 1978, Ser. No. 936,999

Int. Cl.² H03F *1/34*

U.S. Cl. 330—85 **2 Claims**

1. A tunable narrow-band bandpass filter in which the absolute bandwidth and the center frequency can be controlled independently comprises:

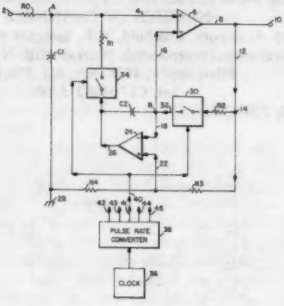
a 3-terminal RC active network in which a ground terminal provides one connection to both the input and the output ports, a first terminal provides the ungrounded connection to the input port, and a second terminal provides the ungrounded connection to the output port, said RC active network comprising:

a first resistor having one terminal end thereof connected to said first terminal of the input port, said first resistor establishing the bandwidth in accordance with the relationship $\delta = \sqrt{3}/2RO$, where δ is the relative bandwidth, and RO is the value of the first resistor;

a first operational amplifier having the non-inverting input terminal connected to the other terminal end of said first resistor, having an inverting input terminal and having an output terminal connected to the second terminal of said active network;

a first capacitor having one terminal end connected to the other terminal end of said first resistor and having the other terminal end connected to said ground terminal;

a feedback network including certain resistive elements the



resistance value of which set the center frequency of the filter in accordance with the relationship $Wo = 1/RC$, where $Wo = 2\pi fo$, and fo is the center frequency, R is the value of the resistance of the resistor and C is the value of the capacitor in the network; said feedback network having an input terminal connected to the output terminal of said first operational amplifier, having a first output terminal connected to the inverting input terminal of said first operational amplifier and having a second output terminal connected to the non-inverting input of said first operational amplifier; and

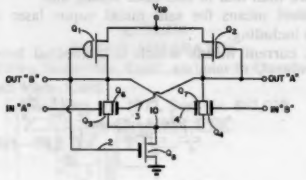
switch means interposed in said feedback network to effect a connection between said resistive elements and said first and second output terminals of the feedback network when said switch means is actuated and opening said connection otherwise; and

programmable timing means providing a plurality of timed outputs for selective connection to said switch means, each timed output setting a predetermined time period during which said switch means is actuated and thereby selectively varying the effective value of the certain resistive elements so that the center frequency of the filter may be programmably changed.

4,232,270
HIGH GAIN DIFFERENTIAL AMPLIFIER WITH POSITIVE FEEDBACK

Melvin L. Marmet, Corona, and Clarence W. Padgett, Westminster, both of Calif., assignors to Rockwell International Corporation, Segundo, Calif.

Filed Jun. 14, 1979, Ser. No. 48,559
Int. Cl.³ H03F 3/45, 3/16
U.S. Cl. 330—253 **8 Claims**



8. A high gain differential amplifier comprising:

a first inverter stage including first series connected depletion and enhancement mode transistor devices, and additional enhancement mode transistor device connected in parallel with said first enhancement mode device;

a second inverter stage including second series connected depletion and enhancement mode transistor devices, and a second enhancement mode transistor device connected in parallel with said first enhancement mode transistor device;

said first and second inverter stages cascaded together between first and second electrical junctions;

voltage source means connected to each of said inverter stages at a first of said electrical junctions;

each of said inverter stages having respective input and output terminal means;

the output means of said first inverter stage being connected to the control electrode of said second enhancement mode transistor device in said second inverter stage, and said output means of said second inverter stage being connected to the control electrode of said enhancement mode transistor device of said first inverter stage;

current source means comprising an additional enhancement mode transistor device connected to each of said inverter stages at the second of said electrical junctions; and

positive feedback means connecting the control terminal of said additional enhancement mode transistor device with the control terminal of said first inverter stage depletion mode transistor device and a point between the first series connected depletion and enhancement mode transistor devices of said first inverter stage for maximizing the gain of said differential amplifier.

4,232,271
INSTRUMENTATION AMPLIFIER WITH EXTENDED COMMON MODE RANGE

Robert C. Dobkin, Hillsborough; Tim D. Isbell, San Jose; Bernard D. Miller, Santa Clara, and Lawrence R. Sample, San Jose, all of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

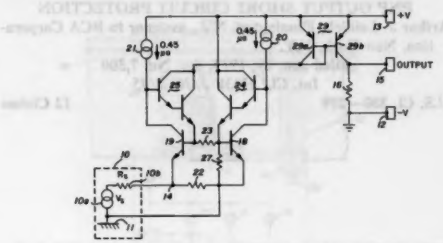
Filed Feb. 5, 1979, Ser. No. 9,639
Int. Cl.³ H03F 3/45
U.S. Cl. 330—258 **10 Claims**

1. A differential input instrumentation amplifier circuit capable of operating from a single power supply and configured to accommodate a range of common mode input signal voltages that includes voltage values that lie within and below the range represented by the span of said power supply, said circuit comprising:

means for coupling said circuit to a power supply having a first ground terminal and a second terminal;

first and second transistors, each having emitter, base, and collector electrodes;

means for coupling said emitters of said first and second transistors to provide the differential input terminals of said amplifier, said input being connectible to a source of signal having a pair of terminals, one of which is a remote ground connection that can cause said pair of terminals to assume a potential substantially different from that of said first ground terminal;



means for coupling constant current devices between said second terminal of said power supply and said collectors of said first and second transistors;

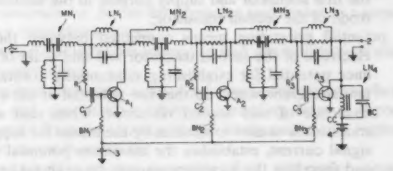
means for biasing the bases of said first and second transistors at one base to emitter diode drop above their respective emitters; and

means for sensing the current in at least one of said means for biasing to provide a signal output representative of the differential input to said emitters.

4,232,272
FEEDBACK-STABILIZED MULTISTAGE FREQUENCY-SELECTIVE AMPLIFIER

Bruno Fabri, Turin, Italy, assignor to CSELT - Centro Studi e Laboratori Telecomunicazioni S.p.A., Turin, Italy

Filed Nov. 1, 1978, Ser. No. 956,441
Claims priority, application Italy, Nov. 2, 1977, 69446 A/77
Int. Cl.³ H03F 3/191
U.S. Cl. 330—294 **6 Claims**



1. A feedback-stabilized frequency-selective amplifier comprising:

a plurality of cascaded amplification stages each including an active component with an input electrode, an output electrode and a common electrode;

a plurality of coupling networks and a like plurality of feedback networks alternately inserted in a series chain between a signal-input terminal and a signal-output terminal, said input electrode of each active component being connected to a junction of a coupling network and a partly inductive feedback network of said chain in a network pair respectively associated therewith, said output electrode of each active component being connected to a downstream end of the associated feedback network; and

a supply of direct current connected between the common electrodes of all active components and a downstream end of said chain proximal to said signal-output terminal for feeding operating power to said stages, said coupling networks having lower impedances than the associated

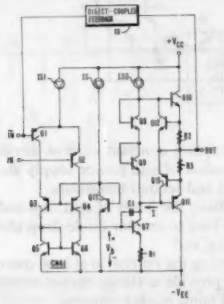
feedback networks for signal frequencies lying within a predetermined band, at least the coupling and feedback networks downstream of the first of said stages having inductive branches conductively interconnected at their junctions with formation of a continuous low-resistance path for direct current from said supply to the output electrodes of all active components.

4,232,273

PNP OUTPUT SHORT CIRCUIT PROTECTION

Arthur J. Leidich, Flemington, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Jan. 29, 1979, Ser. No. 7,500
Int. Cl.[3] H03F *3/30, 3/45*
U.S. Cl. 330—298 **12 Claims**



7. An amplifier having a current limited output comprising:
a common-emitter output transistor amplifier including a first transistor having emitter, base and collector electrodes and an emitter degeneration resistor connecting its emitter electrode to a point of reference potential;
a second transistor of conductivity type opposite to the first transistor, having emitter, base and collector electrodes, and having its collector electrode connected at the base electrode to the first transistor;
respective means for supplying signal current to the base of the first transistor and supply current to the emitter electrode of the second transistor;
potential generating means connected between the base electrode of the second transistor and said point of reference potential for establishing substantially constant potential therebetween, so that the potential at the emitter electrode of said second transistor, when said second transistor is caused to saturate by the means for supplying signal current, establishes the maximum potential across and therefore the maximum current through said emitter degeneration resistor.

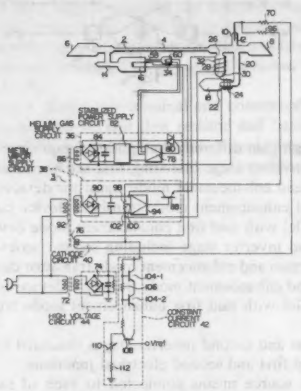
4,232,274

METAL VAPOR LASER SYSTEM

Katumi Tokudome, Saitama; Michio Ishikawa, Kawagoe, and Shuzo Hattori, Nagoya, all of Japan, assignors to Kimmon Electric Co., Ltd., Tokyo, Japan

Filed May 30, 1978, Ser. No. 910,349
Int. Cl.[2] H01S *3/13*
U.S. Cl. 331—94.5 S **14 Claims**

1. A metal vapor laser discharge system comprising a metal vapor laser discharge means and control means for said metal vapor laser discharge means;
said metal vapor laser discharge means including:
a laser vessel filled with an ionizable helium gas;
anode and cathode electrodes which are disposed in said laser vessel with a space therebetween for forming a discharge path;
a gas pressure detecting element in said laser vessel for detecting the helium gas pressure in said laser vessel and providing an output signal which is a function of the detected helium gas pressure;
a metal reservoir containing metal for supplying an ionizable metal vapor into said laser vessel; and
a helium gas supplemental container which is coupled with said laser vessel through a helium gas passing wall permitting helium gas to diffuse due to heating and to pass therethrough, and is filled with the helium gas at a higher pressure than that in said laser vessel; and
said control means for said metal vapor laser discharge means including:
constant current means which is connected between the



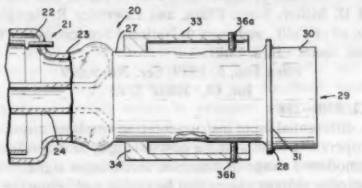
anode and cathode electrodes and maintains substantially constant the discharge current between the anode and cathode electrodes;
metal heating means provided around said metal reservoir;
metal vapor supply means for controlling said metal heating means in accordance with the discharge voltage between the anode and cathode electrodes to maintain substantially constant the ionized metal vapor in said laser vessel; and
helium gas supplemental means for controlling the heating means for heating said helium gas passing wall of said helium gas supplemental container in accordance with the output signal from said gas pressure detecting element to maintain substantially constant the helium gas pressure in said laser vessel.

4,232,275

ADJUSTABLE MIRROR MOUNT FOR A LASER

William P. Kolb, Jr., Carlsbad, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Nov. 9, 1978, Ser. No. 959,391
Int. Cl.[3] H01S *3/086*
U.S. Cl. 331—94.5 D **6 Claims**



1. An adjustable mirror mount for a laser, comprising:
a cylinder having one end attachable to a laser discharge tube and an opposite end attachable to a mirror;

a collar disposed about said cylinder, said collar being mounted to said cylinder and extending substantially the length of said cylinder; and

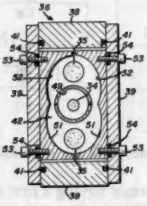
means extending from said collar and impinging upon said cylinder for deflecting said cylinder along its axis.

4,232,276

LASER APPARATUS

Akiyoshi Iwata, Sunnyvale, Calif., assignor to Quanta-Ray, Inc., Mountain View, Calif.

Filed Oct. 11, 1977, Ser. No. 841,019
Int. Cl.[2] H01S *3/02*
U.S. Cl. 331—94.5 D **1 Claim**



1. In a laser:

laser gain medium means for excitation with optical pump energy for inverting the population densities of certain predetermined energy levels of said gain medium which are capable of supporting laser transitions of a predetermined wavelength;

optical resonator means for reflecting optical radiation at said predetermined laser transition wavelength to and fro through said laser gain medium means;

pump means for supplying optical pump energy to said laser gain medium;

said pump means including, housing means for housing at least one flash lamp, pump reflector means disposed within said housing means for reflecting optical pump energy emitted from the flash lamp into said laser gain medium;

fluid flow channeling means for channeling liquid coolant through the region of said housing means between said pump reflector means and said flash lamp, said flow of such liquid coolant being in contact with said flash lamp and said pump reflector means;

ultraviolet light reject filter means interposed between said flash lamp and said laser gain medium means for filtering out ultraviolet light wavelengths of optical pump energy otherwise transmitted from said flash lamp to said laser gain medium;

wherein said fluid flow channeling means includes means for channeling the liquid coolant through the region within said housing means between said laser gain medium means and said filter means between said filter means and said flash lamp, such flow of liquid coolant being in contact with said filter means, said laser gain medium means, and said flash lamp; and

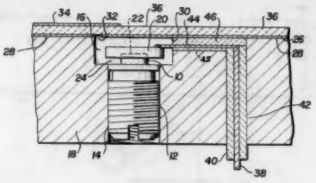
wherein said ultraviolet filter means comprises a sleeve structure surrounding said laser gain medium means, and wherein said sleeve means is split longitudinally to facilitate removal thereof for access to said laser gain medium for cleaning thereof without disturbing the optical alignment of said laser gain medium within said resonator means.

4,232,277

MICROWAVE OSCILLATOR FOR MICROWAVE INTEGRATED CIRCUIT APPLICATIONS

Lawrence E. Dickens, Baltimore, and Douglas W. Maki, Arnold, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 9, 1979, Ser. No. 19,193
Int. Cl.[3] H03B *7/14, 9/14*
U.S. Cl. 331—107 DP **15 Claims**



1. A microwave oscillator utilizing a semiconductor negative resistive device and being particularly adapted for microwave integrated circuit applications such as the pump oscillator for a parametric amplifier comprising, in combination:

a metal body in the form of a planar substrate configuration having resonator cavity means formed therein and having a surface over which is formed a microstrip ground plane, said metal body additionally having a bore therein extending to said resonator cavity means;

a mounting base including a semiconductor assembly, including a semiconductor device adapted to operate as a negative resistive element mounted on one end of said base and being inserted in said bore with said semiconductor assembly extending into said cavity means while said base is fastened to said metal body;

wherein said cavity means includes a radial resonator cavity section formed by a metallic disc resonator element electrically coupled to and being secured to the top portion of said semiconductor assembly within said resonator cavity means;

means included in said metal body and coupled to said semiconductor assembly for applying electrical power to said semiconductor device for operating said device as a negative resistance element;

a non-metallic substrate formed on said metal body over said ground plane;

a length of microstrip conductor formed on the outer surface of said non-metallic substrate extending from a region remote from the locality of said cavity means to a region proximate thereto; and

means coupling microwave energy from said cavity means to said length of microstrip conductor.

4,232,278

HIGH POWER MICROWAVE INTEGRATED CIRCUIT RECEIVER PROTECTOR WITH INTEGRAL SENSITIVITY TIME CONTROL

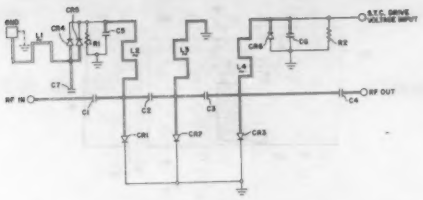
Michael J. Gawronski, Baltimore, and Harry Goldie, Randallstown, both of Md., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jul. 6, 1979, Ser. No. 55,423
Int. Cl.[3] H01P *1/15;* H04B *1/10*
U.S. Cl. 333—13 **3 Claims**

1. A microwave integrated circuit receiver protector for controlling the input to a radar receiver during periods of transmit and receive comprising:

a. a circuit board substrate having a ground plane, a microwave input line, and a microwave output line of substantially the same impedance as the input line;

b. an input PIN diode having a predetermined base region thickness coupled to with the said input line;
c. means including a Schottky barrier diode coupled to with the said input line and the said input PIN diode for providing turn-on bias to the said input PIN diode;
d. means including a discharge resistor coupled to with the said means for providing turn-on bias, and the said input PIN diode for providing fast recovery of the said input PIN diode from the said turn-on bias;

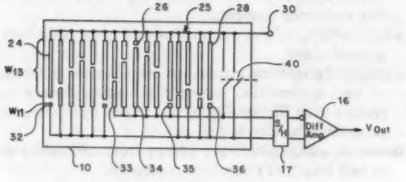


e. an output PIN diode having a determined base region thickness that is less than the said input PIN diode base region thickness coupled to with the said output line;
f. means for applying a dc voltage to the said output PIN diode whereby the said output PIN diode functions as a passive limiter during the transmit period and a controlled sensitivity time controlled attenuator during receive; and
g. means including a limiting PIN diode coupling the said input PIN diode to the said output PIN diode.

4,232,279
LOW NOISE CHARGE COUPLED DEVICE TRANSVERSAL FILTER

Paul R. Prince, Manhattan Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 759,297, Jan. 14, 1977, abandoned, which is a continuation of Ser. No. 597,731, Jul. 21, 1975, abandoned. This application Nov. 15, 1978, Ser. No. 960,903
Int. Cl.[2] H03H *7/28;* **G11C** *19/28;* **H03K** *5/156;* **H01L** *29/78*
U.S. Cl. 333—165 **14 Claims**

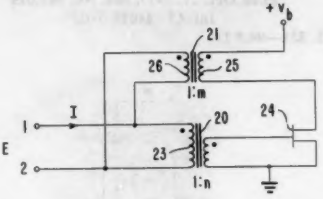


6. A charge coupled transversal filter for providing a selected impulse response having first and second polarity portions, said impulse response being defined by a plurality of weighting coefficients of first and second polarities, comprising
a substrate,
a plurality of weighting electrodes positioned adjacent to each other and along said substrate, each weighting electrode having first and second portions split with an insulating gap, each of said second portions having a length proportional to one of said weighting coefficients, said electrodes corresponding to coefficients of a second polarity having gaps forming an inverted configuration of said impulse response,
reference means coupled to the first portions of said split electrodes,
first and second leads coupled to the second portions representing respective first and second polarity weighting coefficients, for respectively forming the first and second polarity portions of said impulse response, and
combining means coupled to said first and second leads for inverting the signal on said second lead.

4,232,280
NETWORK FOR SIMULATING LOW TEMPERATURE RESISTORS

Robert L. Forward, Oxnard, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 8, 1979, Ser. No. 18,688
Int. Cl.[3] H03H *11/52*
U.S. Cl. 333—213 **6 Claims**

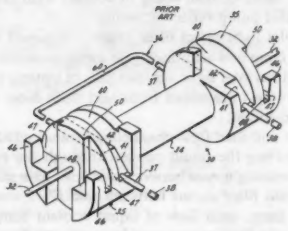


1. A two-terminal network for simulating a resistance comprising:
at least one transformer having a first and second winding;
a field effect transistor having at least a source, drain and gate electrodes;
first means for coupling one of said network terminals to one side of said first winding of said transformer;
second means for coupling the other side of said first winding of said transformer to the other of said network terminals;
third means for coupling said source and gate electrodes of said field effect transistor across said second winding of said transformer; and
fourth means for coupling said drain electrode of said field effect transistor to said one side of said first winding of said transformer.

4,232,281
IN-LINE PACKAGE RELAY

Philip N. Smith, Cincinnati, Ohio, assignor to Standex International Corporation, Salem, N.H.

Filed Jun. 1, 1978, Ser. No. 911,386
Int. Cl.[3] H01H *1/66, 51/00, 11/02*
U.S. Cl. 335—152 **13 Claims**



1. A reed relay comprising,
a bobbin having flanges at each end,
a glass-encapsulated switch located centrally of said bobbin and having a switch terminal projecting from each end,
coil terminals embedded in said flanges and projecting from a side of said bobbin at right angles to the axis of said bobbin,
transverse notches in said flanges,

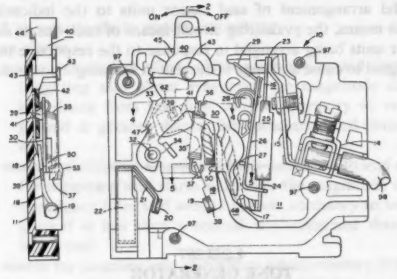
said switch terminals lying in said notches and projecting to a side of said bobbin at right angles to the axis of said bobbin,
and a housing molded around said bobbin,
said coil and switch terminals lying in at least one plane parallel to the axis of said bobbin.

4,232,282

CIRCUIT BREAKER HAVING MEANS TO FACILITATE ASSEMBLY THEREOF

Gustavo A. Menocal, Wilmington, N.C., assignor to Gould Inc., Rolling Meadows, Ill.

Filed Dec. 18, 1978, Ser. No. 970,279
Int. Cl.³ H01H *73/06*
U.S. Cl. 335—202 **10 Claims**



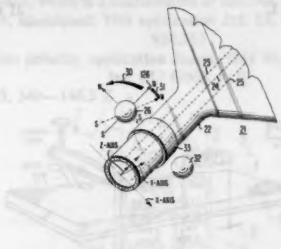
1. A circuit breaker including a stationary contact, a movable contact, an arm having said movable contact mounted on one end thereof, a cradle mounted for movement between a reset and a tripped position, a latch for holding said cradle in said reset position, trip means for automatically releasing said latch responsive to the occurrence of predetermined fault current conditions, an operating member to which the other end of said arm is pivotally connected, a main spring connected between said cradle and said arm and exerting a force component biasing the latter lengthwise toward said operating member, a narrow molded insulating housing defining a chamber, said housing including a base having an open side and integral formations for operatively positioning the previously recited elements of said circuit breaker within said chamber with a manually engageable forward handle portion of said operating member extending outside of said housing through a front opening thereof, said housing also including a cover closing the open side of said base; with said cradle in said reset position, said handle portion being movable between On and Off positions to reposition the other end of said arm relative to the line of action of said spring whereby force exerted by the latter is effective to move said arm and bring about respective closing and opening of said contacts; with said cradle in said tripped position, said spring moving said arm to a contact open position and said handle portion to a trip indicating position intermediate said On and Off positions; with said cradle in said tripped position, said handle portion in said trip position and said cover removed, said spring providing a force component biasing said one end of said arm toward said open side and into engagement with a blocking formation of said cradle; said blocking formation limiting movement of said arm toward said open side; said arm having a transverse projection extending toward said open side; with said cover closing said open side, the inside of said cover engaging said transverse projection to force said arm away from said open side and disengage said arm from said blocking formation.

4,232,283

ELECTRON BEAM MOVING APPARATUS FOR A COLOR CATHODE RAY TUBE

Joseph L. Werst, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 27, 1979, Ser. No. 24,392
Int. Cl.³ H01J *29/51*
U.S. Cl. 335—212 **7 Claims**



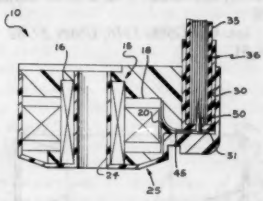
1. An electron beam moving apparatus for a color cathode ray tube, with three in-line electron beams located within the envelope of said cathode ray tube, said electron beams traveling along the longitudinal axis of said cathode ray tube, comprising:
a first magnetic field producing structure with at least two magnetic poles separated along a first polar axis;
a support housing for locating said first magnetic field producing structure adjacent a first outer electron beam of said three in-line electron beams; and
first means for rotationally securing said first magnetic field producing structure for permitting alignment of said first polar axis with said longitudinal axis and for permitting rotation of said first polar axis away from alignment with said longitudinal axis in both horizontal and vertical planes.

4,232,284

IGNITION COIL AND ELECTRICAL CONNECTOR THEREFOR

Russell E. Phelon, East Longmeadow, Mass., and Henry A. Hawken, Granby, Conn., assignors to Power Parts, Inc., Carolina, P.R.

Filed May 7, 1979, Ser. No. 36,851
Int. Cl.³ H01F *27/04, 15/10*
U.S. Cl. 336—90 **4 Claims**



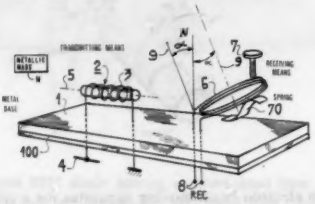
1. Ignition coil for an internal combustion engine comprising a housing, a secondary coil disposed within said housing and being convolutely wound of alternate layers of conductor wire and insulating paper, the outer end of said conductor wire being bonded in electrical contact with a conductive foil terminal disposed on the outer surface of the coil, a lead wire extending into said housing for connecting the voltage induced in said secondary coil to a spark gap device of the engine, a spring contact member interconnecting in a tensioned condition said lead wire and said conductive foil terminal.

4,232,285

ELECTROMAGNETIC DETECTOR RESPONSIVE TO A MODIFICATION OF A MAGNETIC FIELD

Jean-Raymond Narbaits-Jaureguy; Henri Billottet, and Pierre Granier, all of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Nov. 18, 1977, Ser. No. 852,726
Claims priority, application France, Nov. 19, 1976, 76 34916
Int. Cl.[3] G08G *1/02*; G01N *27/72*; E01F *11/00*
U.S. Cl. 340—38 L **21 Claims**



1. An electromagnetic detector responsive to the proximity of a metallic mass, comprising:

a metallic base having a flat upper surface;

a supply of alternating current;

transmitting means on said base, including a first coil with an axis parallel to said surface, connected to said supply for generating a surrounding electromagnetic field inducing eddy currents in said base;

receiving means on said base, including a second coil with an axis inclined to said surface, spaced from said transmitting means and positioned to pick up a measuring field produced by said eddy currents together with a component of the surrounding field as modified by a metallic mass in the vicinity, thereby generating a resulting signal varying with the presence or absence of such mass; and

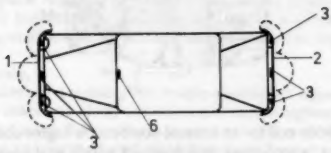
processing means connected to said receiving means and to a source of reference oscillation energized from said supply for evaluating said resulting signal to indicate the proximity of said mass.

4,232,286

APPARATUS TO INDICATE THE SPACING BETWEEN A VEHICLE AND A METAL ARTICLE

Walter Voll, Industriestrasse 40, 8728 Hassfurt, Fed. Rep. of Germany

Filed May 17, 1978, Ser. No. 906,803
Claims priority, application Fed. Rep. of Germany, May 18, 1977, 2722498
Int. Cl.[3] G08G *1/16*; G01N *27/82*
U.S. Cl. 340—51 **14 Claims**



1. Apparatus mounted on a vehicle and arranged to provide a signal indicative of the spacing between the vehicle and a metal article being less than a predetermined amount, said predetermined amount being small compared with the length of the vehicle, the apparatus in combination with said vehicle comprising sensor units mounted to at least one fender and comprising at least one sensor unit mounted to a respective end portion of said at least one fender, of said vehicle, said sensor units being arranged in parallel with each other and each comprising:

(a) a coil;

(b) oscillator circuit means coupled to said coil and arranged in combination with said coil to generate a respective stray electromagnetic field, and to provide an output signal in response to any disturbance of said electromagnetic field as a result of the spacing between said vehicle and said metal article being less than said predetermined amount;

(c) regulating circuit means arranged to receive said output signal and to compensate the disturbance of said electromagnetic field after a predetermined delay in response to said output signal, and

(d) evaluating circuit means arranged to receive said output signal provided by said oscillator circuit means;

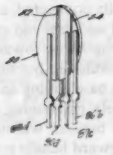
said apparatus further comprising spacing indicating circuit means mounted internally of the vehicle, and a single conductor line and earth return means electrically connecting said parallel arrangement of said sensor units to the indicating circuit means, the evaluating circuit means of each one of said sensor units being arranged in response to the respective output signal to cause a change in current in said single conductor line.

4,232,287

TONE GENERATOR

Michael Slavin, Troy, and Juhan Telmet, Fraser, both of Mich., assignors to Lectron Products, Inc., Troy, Mich.

Division of Ser. No. 814,417, Jul. 11, 1977. This application Feb. 21, 1979, Ser. No. 13,094
Int. Cl.[3] B60R *21/10*
U.S. Cl. 340—52 E **6 Claims**



1. A positive temperature coefficient (PTC) resistance element for a seat belt monitoring system for an automobile that is adapted to provide timed audible and visual signals when operation of said automobile is initiated without the seat belt being properly buckled; said PTC resistance element being characterized by a body of PTC material having an anomaly temperature; said body having electrically conductive contact surface layers on different discrete surfaces of said body, one of said conductive surface layers being adapted to be connected to a source of electrical power, the other of said conductive surface layers defining first, second and third contact areas electrically isolated from each other, said contact areas being apportioned and disposed so that said first and second contact areas are substantially larger than said third contact area, and said second contact area is disposed between said first and third contact areas, said first contact area being adapted to be connected to an electrical ground, said second contact area being adapted to be connected to provide said visual signal and said third contact area being adapted to be connected to provide said audible signal.

4,232,288

VEHICLE ALARM

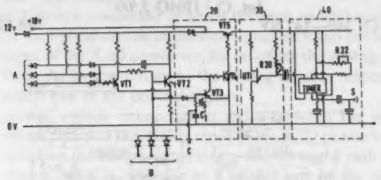
Raymond J. Masterman, 21 Hartfield Crescent, Wimbledon, London SW19, England

Filed Aug. 22, 1978, Ser. No. 935,842

Claims priority, application United Kingdom, Aug. 23, 1977, 35318/77

Int. Cl.[2] B60R 25/10

U.S. Cl. 340—63 9 Claims



1. A vehicle alarm system comprising:

an alarm;

means for coupling a first vehicle accessory to said alarm for triggering said alarm whenever the magnitude of the impedance from said first vehicle accessory to vehicle ground is greater than a first predetermined threshold level;

means for coupling a second vehicle accessory to said alarm for triggering said alarm whenever the magnitude of the impedance from said second vehicle accessory to vehicle ground is less than a second predetermined threshold level; and

means for coupling said alarm to a vehicle battery for triggering said alarm whenever said vehicle battery is electrically disconnected from said alarm.

4,232,289

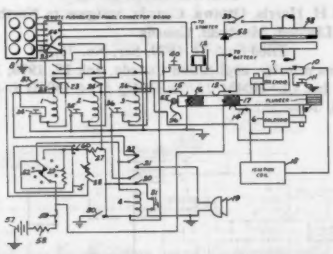
AUTOMOTIVE KEYLESS SECURITY SYSTEM

Don H. Daniel, 5114 Huisache, Bellaire, Tex. 77401

Filed Oct. 24, 1978, Ser. No. 954,234

Int. Cl.[3] B60R 25/04

U.S. Cl. 340—64 10 Claims



1. In an electric permutation lock and alerting system having, in cascade, a plurality of combination selecting stages operable by remote switch means, actuation of first said stage being dependent on actuation of said remote switch means, actuation of each successive said stage being dependent on successive actuation of said remote switch means plus actuation of each prior said stage, actuation of final said stage causing an unlock voltage to operate a plunger means, having lock and unlock means to move said plunger means in opposite directions, wherein the improvement comprises an automotive application whereby said plunger means, in locked position, blocks the unlock travel path and movement, in the unlock direction, of a remote hood latch cable, and wherein said blockage of said movement in unlock direction prevents access to the engine compartment.

4,232,290

HANDWRITTEN CHARACTER IDENTIFICATION

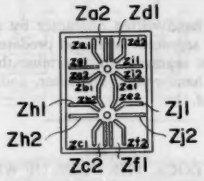
Syoichi Yasuda, Nara, and Yoshiki Nishioka, Tenri, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation-in-part of Ser. No. 814,419, Jul. 11, 1977, abandoned, which is a coatinuation of Ser. No. 579,578, May 21, 1975, abandoned. This application Jul. 13, 1978, Ser. No. 924,362

Claims priority, application Japan, May 21, 1974, 49/57643

Int. Cl.[3] G06K 9/50

U.S. Cl. 340—146.3 Z 13 Claims



1. A method of identifying an alpha-numeric handwritten character comprising the steps of:

forming said handwritten character within a predetermined area,

said area being divisible into definable regions by a first reference pattern containing first and second spaced constraining dots and a plurality of radius vector means, extending from the region of each of said constraining dots, each of said radius vector means having at least two vector segments,

said radius vector means extending from said first constraining dot including six vertical radius vector segments including four radius vector segments Za_1, Za_2, Zd_1, Zd_2 extending upwardly from said first constraining dot and two radius vector segments Zb_1, Ze_1, extending downwardly from said first constraining dot toward said second constraining dot and four horizontal radius vector segments including two radius vector segments, Zg_1, Zg_2, extending from one side of said first constraining dot and two radius vector segments, Zi_1, Zi_2 extending from the opposite side of said first constraining dot,

said radius vector means extending from said second constraining dot including six vertical radius vector segments including four radius vector segments Zc_1, Zc_2, Zf_1, Zf_2 extending downwardly from said second constraining dot and two radius vector segments Zb_2, Ze_2 extending upwardly from said second constraining dot toward said first constraining dot and four horizontal radius vector segments including two radius vector segments Zh_1, Zh_2 extending from one side of said second constraining dot and two radius vector segments Zj_1, Zj_2 extending from the opposite side of said second constraining dot,

said area also being divisible into definable regions by a second reference pattern in the form of a character font consisting of horizontal and vertical font segments including six horizontal font segments Sa, Sd, Sb, Se, Sc, Sf and four vertical font segments, Sg, Si, Sh, Sj, said font segments collectively forming a figure eight configuration,

each character to be idenfified having a shape which can be approximated by a predetermined combination of font segments,

the identity and location of each font segment in said area being definable by conditions of coincidence of portions of said handwritten character with predetermined pairs of said radius vector segments,

detecting which predetermined pairs of said radius vector

segments have portions which are coincident with portions of said handwritten character formed in said area to establish said conditions of coincidence and to identify those font segments satisfying said conditions of coincidence from the following logic equations:

$$Sa = Za_1 \cdot Za_2$$
$$Sb = Zb_1 + Zb_2$$
$$Sc = Zc_1 \cdot Zc_2$$
$$Sd = Zd_1 \cdot Zd_2$$
$$Se = Ze_1 + Ze_2$$
$$Sf = Zf_1 \cdot Zf_2$$
$$Sg = Zg_1 \cdot Zg_2$$
$$Sh = Zh_1 \cdot Zh_2$$
$$Si = Zi_1 \cdot Zi_2$$
$$Sj = Zj_1 \cdot Zj_2$$

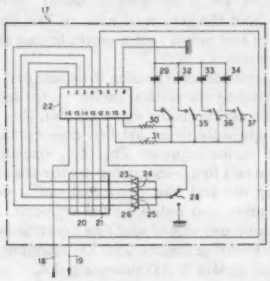
identifying said handwritten character by correlating the identified font segments with said predetermined combinations of font segments to determine the approximate shape of said handwritten character, and therefore, the identity thereof.

4,232,291

ELECTRONIC LOCK, THE CODE OF WHICH CAN EASILY BE MODIFIED BY THE USER

Raymond Bernier, Vincennes, France, assignor to International Detection Protection, France

Filed Oct. 13, 1978, Ser. No. 951,412
Claims priority, application France, Oct. 25, 1977, 77 32838
Int. Cl.[2] H04Q *1/32;* **E05B** *49/00;* **B60R** *25/04;* **G08B** *13/08*
U.S. Cl. 340—147 MD **2 Claims**



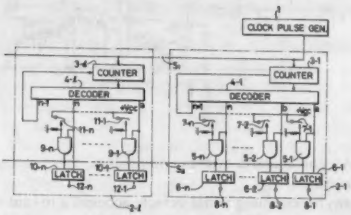
1. An electronic lock and key system for generating latch actuating and security signals, comprising: a lock circuit unit; a detachable key circuit unit; means for establishing a removable electrical connection between the key circuit unit and the lock circuit unit; each circuit unit including externally accessible and programmable contact matrix means each establishing a specific code; the key circuit unit comprising pulse code modulated oscillator means having a plurality of control terminals connected to the key contact matrix means and a signal output on which pulses coded according to a key code are sequentially transmitted; the lock circuit unit comprising shift-register means converting the said sequentially transmitted coded pulses into a parallel logic signal and gating means, having a plurality of control inputs connected to the lock contact matrix means, said gating means being connected to the shift register means and comparing the said parallel logic signal to the lock code programmed on the lock contact matrix means, said gating means having an output on which a latch actuating signal is generated each time the said lock code and the said parallel logic signal coincide and a security signal each time the said lock code and the said parallel logic signal do not coincide, the said means for establishing a removable electrical connection essentially consisting of a power supply lead and a signal transmitting lead, the signal transmitting lead connecting the signal output of the said oscillator means to the said shift-register means.

4,232,292

DATA TRANSMITTER DEVICE

Katsuya Yasuda, Yokohama, and Akio Adachi, Kawasaki, both of Japan, assignors to Hochiki Corporation, Tokyo, Japan

Filed Mar. 5, 1979, Ser. No. 17,769
Claims priority, application Japan, Mar. 7, 1978, 53-24961
Int. Cl.[2] H04Q *5/00*
U.S. Cl. 340—147 SY **15 Claims**



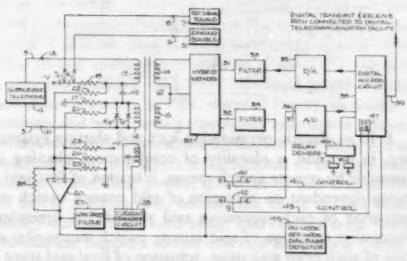
1. A data transmission system comprising: a clock pulse generator generating output clock pulses, a plurality of transmitters, each transmitter including scanning means receiving clock pulses, a plurality of switches for inputting data, gate circuit means receiving the outputs of said plurality of switches through one input thereof, memory means for temporarily storing the outputs of said gate circuit means, and wherein said scanning means applies output signals to said gate circuit means successively in synchronization with the clock pulses of said clock pulse generator, said transmitters being interconnected first by a synchronous line adapted to apply the output pulses of said clock pulse generator to the scanning means in said plurality of transmitters and secondly by a signal line connecting the output terminals of said gate circuit means in said plurality of transmitters.

4,232,293

LINE INTERFACE UNIT FOR VOICE AND WIDE BAND SIGNAL COUPLING

Harold H. Harris, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Sep. 17, 1979, Ser. No. 76,148
Claims priority, application Canada, Jul. 27, 1979, 332660
Int. Cl.[3] H04M *11/00;* **H04Q** *3/14;* **H04B** *3/42*
U.S. Cl. 340—147 R **5 Claims**



1. A line unit for interfacing an analog line with a digital telecommunication facility, the line unit comprising:

an analog to digital (A/D) converter, having an analog input for receiving analog signals, for encoding said analog signals for use in the digital telecommunication facility;

a control means for generating a plurality of control signals, one at any one time, in response to directions received in the line unit by way of the telecommunication facility; and

a line circuit including:

a first signal path for carrying a voice band analog signal and including a hybrid circuit for connection to the analog line;

a second signal path for carrying a wide band analog signal in a frequency range extending from direct current into the voice band;

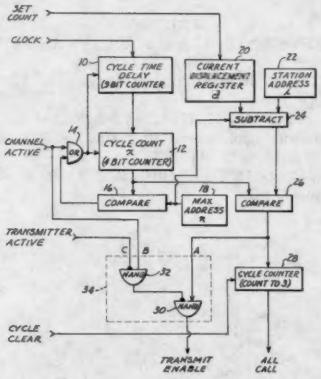
a first switch connected in series between an analog output of the hybrid circuit in the first signal path and the analog input of the A/D converter, for coupling the analog signal from the hybrid circuit to the analog input in response to a first one of the control signals;

a second switch connected in series between the second signal path and the analog input of the A/D converter, for coupling the analog signal on the second signal path to the analog input in response to a second one of the control signals.

4,232,294
METHOD AND APPARATUS FOR ROTATING PRIORITIES BETWEEN STATIONS SHARING A COMMUNICATION CHANNEL

Robert G. Burke, Santa Ana, and Robert F. Martin, Villa Park, both of Calif., assignors to Control Data Corporation, Minneapolis, Minn.

Filed Apr. 30, 1979, Ser. No. 34,236
Int. Cl.³ H04Q 9/00
U.S. Cl. 340—147 LP **11 Claims**

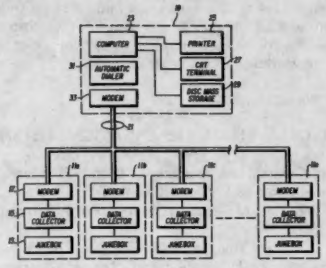


1. Apparatus for allocating use of a communication channel shared by a plurality of stations, each station having a respective address and each station having a controller responsive to an enable signal to enable the station to seize use of the channel, said apparatus comprising, at each station: register means for storing a representation of the address of the station having the highest priority; means responsive to the representation stored in said register means and to the address associated with the respective station for establishing a priority number for the respective station; cyclic counter means for storing a count number; clock means for continuously advancing the count number in said counter means; and compare means responsive to a comparison between said count number and said priority number for providing said enable signal to said controller.

4,232,295
JUKEBOX POLLING SYSTEM

George B. McConnell, Vienna, Va., assignor to Data Information Systems Corporation, Alexandria, Va.

Filed Apr. 13, 1979, Ser. No. 30,055
Int. Cl.² H04Q 9/14
U.S. Cl. 340—152 R **6 Claims**



1. A data acquisition and transmission system for monitoring a plurality of remotely located check-controlled song reproduction devices each device including means for identifying a song position, said system comprising:

a song collector and transmitter unit physically connected to a song reproduction device so as to receive signals identifying a record position selected;

said unit being capable of interpreting signals received from said song reproduction device so as to count all occurrences of all record positions selected;

said unit including means to memorize the identification signal for each record position;

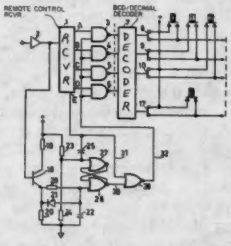
said means capable of storing the number of times each record position is selected over a period of times;

said unit including a transmitting means capable of transmitting stored information to a collector/scanner.

4,232,296
REMOTE CONTROL/DIGITAL TUNING INTERFACE WITH PARALLEL OPERATION WITH MANUAL SWITCHES

Dominik Filipovic, Toronto, Canada, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 808,785, Jun. 22, 1977, abandoned.
This application Feb. 26, 1979, Ser. No. 15,033
Claims priority, application Canada, Jun. 29, 1976, 255915
Int. Cl.³ H04Q 5/00
U.S. Cl. 340—167 R **3 Claims**



1. A system for interfacing a remote control unit with a receiver having a plurality of switches, said system comprising a remote control receiver having input means for receiving a signal encoded with a plurality of function control bits and an extra bit, a plurality of outputs for supplying said function

control bits respectively, and an output for supplying said extra bit; a plurality of gates having first inputs coupled respectively to said plurality of outputs of said remote control receiver, second inputs, and outputs; a decoder having inputs coupled to said gate outputs respectively, and a plurality of outputs; a plurality of electronic switches having control inputs coupled to said decoder outputs respectively, and conduction electrodes adapted to be coupled in parallel to said receiver switches; and means coupled between said extra bit output means and said second inputs of said gates for ensuring that said function control bits are supplied to said decoder inputs only during the duration of said extra bit.

4,232,297
REMOTE CONTROL ARRANGEMENT USING PULSE SPACING MODULATOR

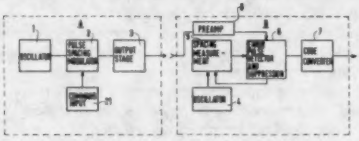
Albrecht Gerlach, Emmendingen; Dieter Holzmann; Guenter Lindstedt, both of Freiburg, and Rolf-Dieter Burth, Oberried, all of Fed. Rep. of Germany, assignors to ITT Industries, Inc., New York, N.Y.

Filed Dec. 15, 1978, Ser. No. 970,059

Claims priority, application Fed. Rep. of Germany, Jan. 24, 1978, 2802867

Int. Cl.³ H04Q *9/10*

U.S. Cl. 340—168 S **4 Claims**



1. In a remote control system of the type including a transmitter capable of transmitting a digital control command signal comprising a predetermined number of pulses, each indicative of a binary one or a binary zero, with a binary one manifesting a separation from a successive pulse of a fixed period 2T, with a binary zero manifesting a separation from a successive pulse of a fixed period T, said control signal always of a given pattern as starting with a first prepulse Z, followed by a second start pulse X separated from said first prepulse Z by a fixed period 3T, with a first command pulse C always following said X pulse by the period T with a fixed number of information pulses indicative of binary ones and zeroes, as determined by said fixed period separation, following said first command pulse, with a terminating end pulse Y spaced from said last information pulse by the period 3T, whereby a complete control command signal is always of the form Z,X,C, X_1,X_2 . . . X_N1Y, where:

X_1=first binary bit (zero or one)

X_2=second binary bit (zero or one)

X_N=last binary bit (zero or one)

wherein:

if X_1 is a zero, it is separated from X_2 by T, and if X_1 is a one, it is separated from X_2 by 2T,

the combination therewith of receiving apparatus for detecting said command signal as transmitted, comprising:

preamplifier means responsive to the reception of said command signal and responsive to said Z pulse for reducing the gain of said preamplifier upon receipt of any pulse indicative of a Z pulse, whereby a reduction of gain is indicative of an anticipated following transmission of the remainder of said command signal, said preamplifier providing at an output, an amplified version of said command signal,

an oscillator circuit for providing a continuous train of pulses, each separated by a substantially smaller period than said fixed period T, with said pulse train at a given random frequency with respect to said command signal,

an up-down counting means responsive to said continuous train of pulses for counting said pulses in an up direction in a first mode and a down direction in a second mode,

first logic means coupled to said counter and responsive to said start pulse X for causing said up counter to commence counting said train of pulses in said first mode,

memory means coupled to said up-down counter and operative to store said count upon receipt of a control signal,

second logic means coupled to said memory means and responsive to said first command pulse C to provide said control signal to cause said memory to store said count indicative of a given number of pulses emanating from said oscillator during the period T as separating said X pulse from said first command pulse C, said logic means including means for coupling said control signal to said up-down counter to cause said counter to commence counting in said second mode,

zero detecting means coupled to said up-down counter and operative to decode an all zero state indicative of said counter counting down said period T, said detecting means including means for transferring said count as stored in said memory to said up-down counter to again cause said counter to count down from said stored count,

binary counting means coupled to said zero detecting means and responsive to said input signal to provide an output indicative of the number of all zero states manifested by said up-down counter between successive pulses of said command signal, whereby a count of one manifests the receipt of a binary zero indicative of a T pulse separation, a count of two manifests the receipt of a binary one indicative of a 2T pulse separation and a count of three manifests receipt of a terminating pulse indicative of a 3T separation,

register means coupled to said binary counting means and responsive to said input signal for storing values indicative of binary ones and zeroes as determined by said T or 2T separation, with said data as stored indicative of said information bits of said digital command signal.

4,232,298
REMOTELY-CONTROLLABLE RELAYS AND FILTERS THEREFOR

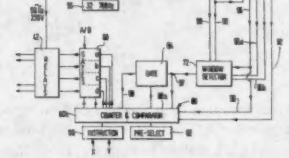
Anthony J. Ley, Bievres, France, assignor to ENERTEC, Montrouge, France

Filed May 12, 1978, Ser. No. 905,394

Claims priority, application United Kingdom, May 16, 1977, 20563/77; Sep. 23, 1977, 39652/77

Int. Cl.² G01R *23/02*; H03K *9/06*; H04Q *9/10*

U.S. Cl. 340—171 R **21 Claims**



1. A remotely-controllable relay for effecting a switching operation in response to a control signal in the form of an alternating ripple voltage at a first predetermined frequency superimposed upon and asynchronous with an alternating power supply voltage in an electric-power distribution network, comprising:

an input for receiving the network voltage and supplying a signal derived therefrom;

means for generating a signal at a second predetermined frequency independent of the power supply frequency and

selected to be different from the nominal value of said first frequency and further selected such that the difference frequency of the first and second frequencies is less than any of the first, second and power supply frequencies;

means connected for receiving and mixing said second-frequency signal and said signal supplied by the input, whereby to produce an output signal including, if said control signal is present on the network, a component at the difference frequency;

filter means connected to receive the output signal of the mixing means, and arranged to pass said difference frequency and to attenuate higher frequencies; and

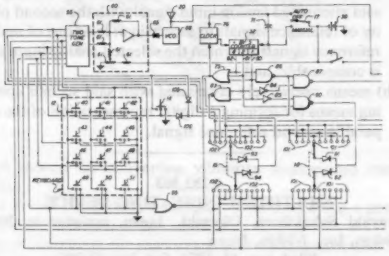
means connected to the filter means to detect the presence of said component and to effect said switching operation in accordance therewith.

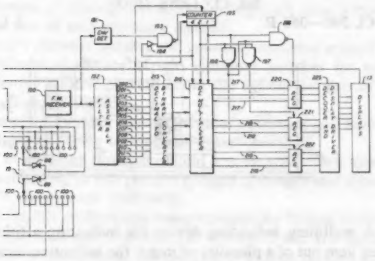
4,232,299

WIRELESS OUTPUT/INPUT SYSTEM

Robert M. Eisenberg, Woodbine, Md., assignor to The Singer Company, Binghamton, N.Y.

Filed Aug. 2, 1978, Ser. No. 930,356
Int. Cl.³ H04Q *9/12*
U.S. Cl. 340—171 R **19 Claims**





1. A remote controlled wireless transmitter receiver system for entering, and verifying control information or instructions and data into a general purpose electronic computing device, said remote controlled wireless transmitter receiver system comprising:

a portable hand held housing,

means connected to said housing for manually entering information, instructions and data,

a multi tone generator whose inputs are coupled to said entering means, said multi tone generator outputs different frequencies for different information that it receives,

amplifying means for amplifying and converting the frequency output of said multi tone generator into voltages, the input of said amplifying means being coupled to the output of said tone generator,

transmitter means whose input is coupled to the output of said amplifying means for producing and transmitting a radiated radio frequency output which is modulated in frequency at a rate and amplitude proportional to the voltage produced by said amplifying means,

means for supplying power coupled to said entering means, said multi tone generator, amplifying means and said transmitter means,

receiver means within said housing for receiving radio frequency information transmitted by said general purpose electronic computer device,

decoding means for decoding and converting the output of said receiver means, the input of said decoding means being coupled to the output of said receiver means,

a plurality of registers for temporarily storing the information produced by said decoding means, the input of said registers being connected to the output of said decoding means, and the output of said registers being coupled to the input of means to verify said information, and

timing means whose input is coupled to the output of said receiver means and whose output is coupled to the load input of said registers,

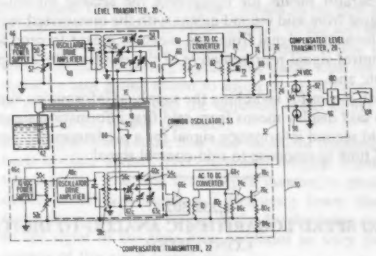
whereby said registers are able at the proper times to receive and to transmit said entered control information or instructions and data to said electronic computing device.

4,232,300

LEVEL MEASURING SYSTEM USING ADMITTANCE SENSING

William S. Wright, Dublin, and Kenneth M. Loewenstern, Warminster, both of Pa., assignors to Drexelbrook Controls, Inc., Horsham, Pa.

Filed Nov. 24, 1978, Ser. No. 963,299
Int. Cl.³ G08C *19/10*; G01R *27/00*
U.S. Cl. 340—840.39 **12 Claims**



1. In a transmitter system comprising a power supply and a load at one location and two-wire transmitter means at another location interconnected by two pairs of transmission lines carrying a variable signaling current; said transmitter means comprising:

an admittance sensing means including a first condition sensing element for sensing an admittance characteristic of material corresponding to the level or condition thereof and a second compensating sensing element for sensing an admittance characteristic of the composition of said material; p1 a single oscillator;

a first admittance sensing network coupled to said first sensing element and said oscillator;

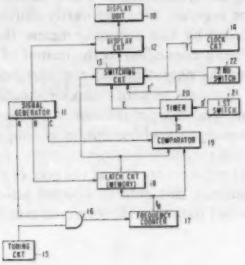
a second admittance sensing network coupled to said second sensing element and said oscillator; and

output means coupled to said first and said second admittance sensing networks for varying the signaling current in each of said pairs of transmission lines in response to the condition and composition of said material respectively.

4,232,301
APPARATUS FOR AUTOMATICALLY SELECTIVELY DISPLAYING INFORMATION OF A PLURALITY OF KINDS

Koh Nomoto, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Mar. 24, 1978, Ser. No. 889,800
Claims priority, application Japan, Mar. 25, 1977, 52/33728
Int. Cl.[2] G08B *19/00*; G04B *19/24*; H04B *1/16*
U.S. Cl. 340—789 **14 Claims**



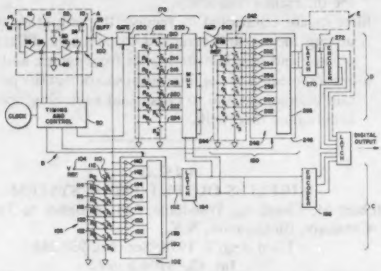
1. An apparatus comprising:
first means for producing a first information signal representative of information of a first kind;
second means for producing a second information signal representative of information of a second kind, the information of said second kind being optionally variable, said second information signal being variable in response to a variation in the information of said second kind;
display means for displaying the information of any of at least said first and said second kinds;
memory means for memorizing said second information signal;
comparator means for comparing the second information signal from said second means with the memorized second information signal from said memory means to produce a control signal representative of the result of the comparison; and
switch means for switching the supply of information signals to said display means from said first information signal to said second information signal for a predetermined period of time in response to said control signal.

4,232,302
VIDEO SPEED LOGARITHMIC ANALOG-TO DIGITAL CONVERTER

Carl T. Jagatich, Chagrin Falls, Ohio, assignor to Ohio Nuclear, Inc., Solon, Ohio

Filed Aug. 24, 1978, Ser. No. 936,328
Int. Cl.[3] H03K *13/175*
U.S. Cl. 340—347 AD **19 Claims**

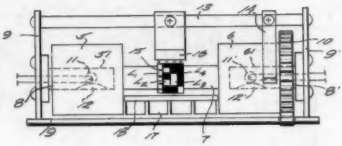
1. A high speed logarithmic analog-to-digital converter comprising:
(a) means for receiving an analog input signal;
(b) means for producing a first plurality of logarithmically incremented reference signals;
(c) a first comparing means operatively connected with said analog input and with said first plurality of reference signals for comparing an analog input signal with the first plurality of reference signals to ascertain at least one of said first reference signals to which the analog input signal is comparable;
(d) means operatively connected with the first comparing means for forming a first digital representation of the comparable first reference signal;
(e) means for producing an attenuated analog input signal, said attenuated analog input signal producing means operatively connected with said analog input signal receiving means;
(f) means for producing a second plurality of logarithmically incremented reference signals;
(g) a second comparing means operatively connected with said means for producing an attenuated analog input signal and said means for producing a second plurality of logarithmically incremented reference signals for comparing said attenuated analog input signal with the second plurality of reference signals to ascertain at least one of said first reference signals to which the selected analog input signal is comparable; and
(h) means operatively connected with said second comparing means for forming a digital representation of the comparable second reference signal.



4,232,303
MULTIITEM INDICATING DEVICE

Yasuyuki Sakakibara, Okazaki, Japan, assignor to Nippon Soken, Inc., Nishio, Japan

Filed Apr. 13, 1979, Ser. No. 29,906
Claims priority, application Japan, Apr. 17, 1978, 53-50645
Int. Cl.[2] G08B *19/00*
U.S. Cl. 340—366 R **5 Claims**



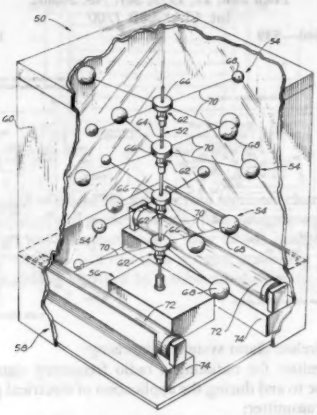
1. A multiitem indicating device for indicating a title of a desired item out of a plurality of items, the indication units and the electrically detected value corresponding to the desired item comprising:
a pair of drums coaxially connected by a connecting shaft so as to be rotated integrally about an axis thereof;
a plurality of titles and corresponding indication units being indicated around the surfaces of said pair of drums, respectively, so as to be opposed to each other along an axis of said pair of drums;
an angular position detecting means for detecting an angular position of said pair of drums and producing electric signals corresponding to said angular position;
a switching means for selecting a detected value out of a plurality of detected values in accordance with said electric signals produced by said angular position detecting means; and
a figure indicator provided in a groove surrounded by said pair of drums and said connecting shaft, and electrically connected to said switching means for indicating said selected detected value.

4,232,304

VIBRATORY-ROTARY MOTION CONVERTERS AND DISPLAY DEVICES INCORPORATING SUCH CONVERTERS

Benton A. Durley, III, Rte. 45, Druce Lake, P.O. Box 304, Grayslake, Ill. 60030

Filed Jun. 11, 1979, Ser. No. 47,168
Int. Cl.³ G08B *5/24*
U.S. Cl. 340—366 B **52 Claims**



1. A device for converting vibratory motion into rotary motion,

said device comprising a vibratory member having a generally cylindrical external surface,

supporting means for supporting said vibratory member for axial vibratory motion along the cylindrical axis of said surface,

vibration producing means for causing such axial vibratory motion of said vibratory member,

a rotary member slidably and rotatably mounted around said cylindrical surface of said vibratory member for rotary motion relative thereto about the cylindrical axis of said cylindrical surface,

a shoulder member on said vibratory member and having a shoulder facing toward said rotary member,

and at least one flexible resilient arm on said rotary member and having an end portion extending toward said shoulder for engagement therewith,

said flexible resilient arm being oriented for flexing motion in a direction such that said end portion of said arm has axial and circumferential components of motion relative to said cylindrical axis,

said rotary member being biased toward said shoulder to produce a yieldable biasing force between said shoulder and said end portion of said flexible arm so that axial vibration of said vibratory member produces flexure of said arm and consequent rotation of said rotary member.

4,232,305

SYSTEM FOR CONTROLLING AN ELECTRONIC WARNING DEVICE

Daniel Lelaidier, Neuilly sur Marne, and Pierre Godard, Tremblay les Gonesse, both of France, assignors to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville, France

Filed Dec. 18, 1978, Ser. No. 970,160
Claims priority, application France, Dec. 28, 1977, 77 39468
Int. Cl.² G08B *3/10*
U.S. Cl. 340—384 E **7 Claims**

1. A system for generating an audible warning signal, the system comprising:

a loudspeaker;

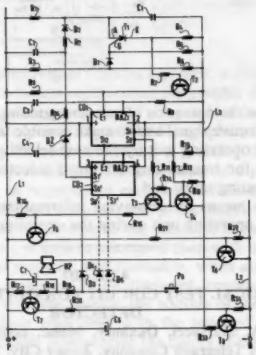
a power transistor connected for driving the loudspeaker;

a single time base oscillator having an output for providing a clock signal at a frequency which is variable over a predetermined range of frequencies and an input for a command signal for varying said output frequency; and

a divider having an input connected to the output of the single time base oscillator to divide the clock signal and a plurality of outputs for producing predetermined integral submultiples of the output frequency from said single time base oscillator, said plurality of outputs including

a first output whereat the oscillator frequency has been divided by a first predetermined integral number of times to produce an audio signal at an audio frequency;

a second output whereat the time base oscillator frequency has been divided a second predetermined integral number of times to produce a signal for adjusting the mark/space ratio of the audio signal;



gating means having a first input coupled to the first output of the divider, a second input coupled to the second output of the divider and an output coupled to the power transistor, said adjusting signal being gated with the audio signal by said gating means to adjust the mark/space ratio of the audio signal, and the adjusted audio signal being applied to the power transistor;

a third output whereat the time base oscillator frequency has been divided a third predetermined integral number of times, greater than said first integral number, to produce a cyclic modulation signal at a frequency lower than the audio signal, said third output of the divider being coupled to the input of the time base oscillator to vary the frequency of the clock signal; and

a fourth output whereat the time base oscillator frequency has been divided a fourth predetermined integral number of times, greater than said third integral number, to produce a timing signal to turn off the audible warning signal after it has sounded for a predetermined period.

4,232,306

SUPERVISORY CONTROL SYSTEM AND APPARATUS

Shuzo Mizuno, Tokyo, Japan, assignor to Kabushiki Kaisha Kogen, Tokyo, Japan

Filed Sep. 14, 1978, Ser. No. 942,420
Claims priority, application Japan, Sep. 20, 1977, 52-112170; Dec. 30, 1977, 52-158948
Int. Cl.² G08B *29/00*
U.S. Cl. 340—506 **11 Claims**

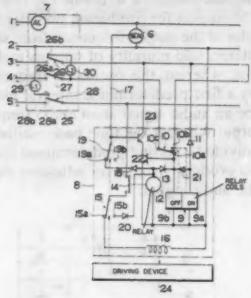
1. A supervisory control system comprising

a plurality of sensors;

an alarm device for providing an alarm by activation of said sensors;

a series of operating units, a given one of said sensors being

associated with a given one of said operating units for providing a sensor signal thereto when said one sensor is actuated, each operating unit comprising a relay for activating a load and transfer means for transferring the operatable state of its corresponding operating unit, said relay being connected for actuation by a selective signal and/or a sensor signal, and said transfer means being connected to



allow the operation of its corresponding operating unit by a selective signal and to make possible the operation of the next operating unit by the next selective signal;

means for transmitting continual selective signals to said operating units; and

display means for displaying information transmitted from said operating unit during the operation thereof.

4,232,307

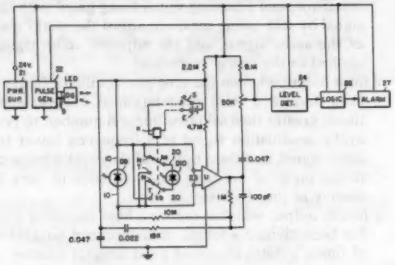
ELECTRICAL TEST CIRCUIT FOR OPTICAL PARTICLE DETECTOR

Angelo A. Marsocci, Duxbury, Mass., assignor to American District Telegraph Company, Jersey City, N.J.

Filed Dec. 18, 1978, Ser. No. 970,620

Int. Cl.[3] G08B *21/00, 17/10*

U.S. Cl. 340—515 **4 Claims**



1. An optical particle detector comprising:

wall means forming a chamber,

means for directing light on a path through the chamber,

a first photovoltaic cell optically disposed to respond primarily to light scattered by a predetermined density of particles in the light path to produce an alarm level signal,

a second photovoltaic cell optically disposed to respond to light from outside the path,

an alarm output connected to the first photovoltaic cell in a predetermined polarity, and

switching means having a first position including connections from the second photovoltaic cell to the alarm output in a first polarity opposing the signal from the first cell, and including a second position including connections from the second cell to the alarm output in the reverse of the first polarity thereby to reinforce and raise the level of the signal of the first cell at the output in the second position to alarm level so as to indicate operativeness of the light directing means and first cell.

4,232,308

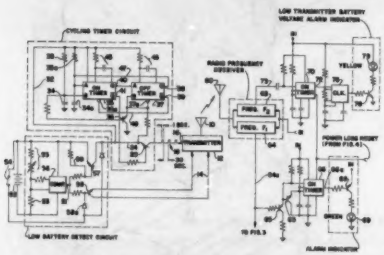
WIRELESS ALARM SYSTEM

Maw H. Lee, Broadview Heights, and John E. Keim, Lodi, both of Ohio, assignors to The Scott & Fetzer Company, Cleveland, Ohio

Filed Jun. 21, 1979, Ser. No. 50,802

Int. Cl.[3] G08B *1/00*

U.S. Cl. 340—539 **10 Claims**



1. A wireless alarm system comprising:

a transmitter for radiating a radio frequency signal in response to and during the application of electrical power to the transmitter;

a battery for providing electrical power to the transmitter;

transmitter timer circuitry for intermittently applying to the transmitter electrical power provided by the battery, the timer circuitry being electrically series-inserted between the transmitter and the battery;

switching means responsive to a predetermined alarm condition detected at the general site of the transmitter, activation of the switching means initiating operation of the transmitter timer circuitry, the operating timer circuitry intermittently applying power to the transmitter at regular predetermined intervals while the switching means remains activated, the transmitter intermittently radiating the signal in response to the intermittent application of power to the transmitter; and

a radio frequency receiver for reception of the radiated signal, the radio frequency receiver activating at least one alarm indicator in response to reception of the radiated signal, the duration of alarm indicator activation being substantially greater than the duration of the radio frequency signal radiated by the transmitter during the application of power to the transmitter by the timer circuitry.

4,232,309

ROLLER SHUTTER

Manfred Dillitzer, Grobenzell, Fed. Rep. of Germany, assignor to Perfecta Rolladen Karl & Co., Westendorf, Fed. Rep. of Germany

Filed Nov. 9, 1978, Ser. No. 959,144

Claims priority, application Fed. Rep. of Germany, Nov. 16, 1977, 7735191[U]

Int. Cl.[3] G08B *13/08*

U.S. Cl. 340—547 **6 Claims**

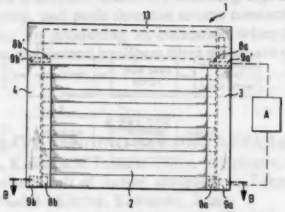
1. An alarm actuated roller shutter comprising:

a pair of opposed guide rails having a guide cross sectional chamber;

a roller shutter having a plurality of interconnected armor links disposed for movement along said guide rails, said links protruding into the guide cross sectional chambers at the lateral ends of said links;

at least one magnetic switch for actuating an alarm system, said magnetic switch comprising a first means having

contacts which are actuated in response to a magnetic field and a second means for producing the magnetic field, one of said first and second means located on one of the lowermost of said links on the inner side of said roller shutter and the other of said first and second means fixedly



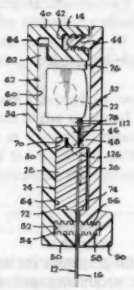
mounted adjacent the guide cross sectional chamber of at least one of said guide rails, said first means being actuated by said second means in the fully closed position of said roller shutter, said one means being accessible when the roller shutter is raised by a substantial distance.

4,232,310

PROTECTIVE WINDOW SCREEN ASSEMBLY

Clarence P. Wilson, Torrance, Calif., assignor to Imperial Screen Company, Inc., Lawndale, Calif.

Filed May 18, 1979, Ser. No. 40,660
Int. Cl.³ G08B *13/08*; A47G *5/00*
U.S. Cl. 340—550 **15 Claims**



1. An alarm screen assembly comprising:

a screen mesh sheet formed primarily of nonconductive strands and also including a plurality of insulated electrically conductive security strands extending parallel to one another, said mesh sheet having a pair of opposite sides and said security strands extending largely perpendicular to and between said sides;

a pair of electrically conductive cross wires extending along opposite sides of said mesh sheet and electrically connected to said security strands; and

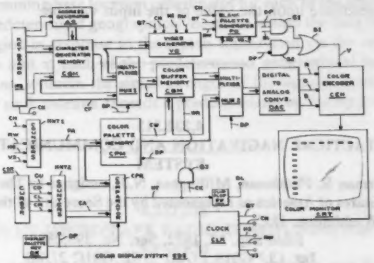
a spline extending along the border of said mesh sheet, said spline having upper and lower spine portions lying on opposite faces of said mesh sheet and over the locations where said cross wires are connected to said security strands, and said spline portions joined together through said mesh sheet, whereby to protect the electrical connections from moisture and aid in mounting the mesh sheet.

4,232,311

COLOR DISPLAY APPARATUS

Roi D. Agneta, Fort Salonga, N.Y., assignor to Chyron Corporation, Melville, N.Y.

Filed Mar. 20, 1979, Ser. No. 22,133
Int. Cl.² G06F *3/14*
U.S. Cl. 340—703 **5 Claims**



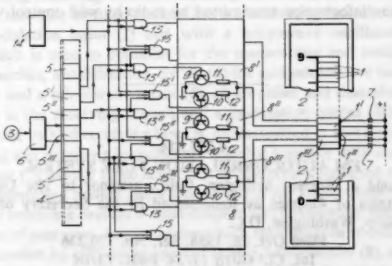
1. In a color display system wherein a graphic is displayed in color in response to indicia representing the graphic shape and other indicia representing the color of the graphic, the method of selecting indicia representing colors for graphics to be displayed comprising the steps of storing a plurality of sets of indicia, each set representing a different color of a palette of colors, displaying in response to each set of indicia a color patch, selecting different color patches to establish a subset of working colors and in response to the selection of each color patch storing the set of indicia associated therewith in a register of an addressed memory, and thereafter, when assigning a working color to a graphic to be displayed, coupling to the indicia associated with the graphic the address of the register containing the indicia associated with the assigned working color so that the indicia representing the colors of the graphic to be displayed is obtained from the addressed memory.

4,232,312

ANALOGUE ELECTRICAL INDICATORS HAVING A SERIES OF ELECTRICALLY-ENERGIZABLE ELEMENTS

Edward S. Eccles, Bishops Cleeve, and Harry Gibson, Bredon, both of England, assignors to Smiths Industries Limited, London, England

Filed Mar. 6, 1978, Ser. No. 882,031
Int. Cl.² G06F *3/14*
U.S. Cl. 340—753 **11 Claims**



1. In an electrical indicator of the kind in which an analogue representation in accordance with the value of an input variable is provided by selective brightening along a reference scale of a consecutive series of electrically-energizable light-emitting elements, the said indicator including energizing means for energizing a predetermined plurality of consecutive

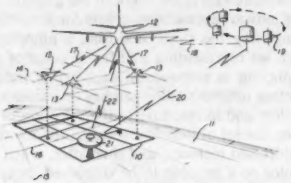
elements of said consecutive series so as to provide brightening throughout only a corresponding limited region of said series, the improvement wherein said energizing means includes means for energizing an element of said series outermost in the said region to a lower brightness level than another of said elements within said region, and means for displacing said energized region along the length of the consecutive series in dependence upon the value of the input variable.

4,232,313

TACTICAL NAGIVATION AND COMMUNICATION SYSTEM

Herman B. Fleishman, Millington, N.J., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 22, 1972, Ser. No. 293,259
Int. Cl.[3] G01S *13/00, 3/02;* G01C *21/00*
U.S. Cl. 343—6 R **17 Claims**



1. The method of navigation in a defined area for community of vehicles including a control vehicle and at least one user vehicle comprising the steps of:

causing said control vehicle to establish a relative grid coordinate system covering the defined area;

causing said control vehicle to transmit by radio relative grid origin and alignment data to each user vehicle;

causing said control vehicle and each user vehicle to periodically establish their respective positions in the relative grid coordinate system by radio range measurements;

navigating said control vehicle and each user vehicle by inertial navigation during the time periods between the periodic radio range measurements; and

periodically updating the navigation information of each user vehicle by combining such inertial information with navigation information transmitted by radio by said control vehicle.

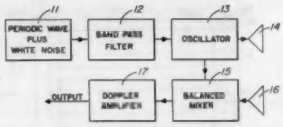
4,232,314

FM AUTOCORRELATION FUZE SYSTEM

Donald J. Adrian, Arlington, Calif., assignor to The United States of America as Represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 28, 1958, Ser. No. 770,236
Int. Cl.[3] G01S *13/34;* F42C *13/04*
U.S. Cl. 343—7 PF **6 Claims**

1. An FM doppler fuze system comprising means for combining a periodic wave with white noise, white noise being a random mixture of frequencies possessing a constant power spectral density, means for modulating a carrier frequency with said periodic wave plus noise and transmitting a signal in the direction of a target, means for mixing a portion of said transmitted signal and a return echo signal from a target, and means for passing the band of expected doppler frequencies



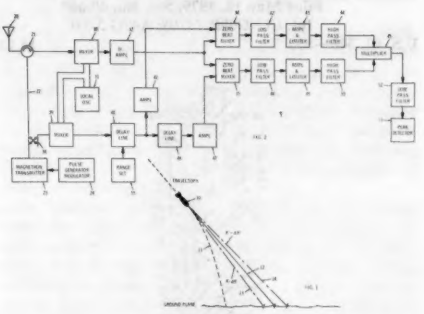
from the output of said mixer to provide an output operable to actuate the detonation circuit of a fuze.

4,232,315

RANGE DETECTOR

Neil C. Kern, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 8, 1966, Ser. No. 594,316
Int. Cl.[3] G01S *13/64, 13/70, 13/18*
U.S. Cl. 343—7.3 **6 Claims**



1. A range determining system including in combination, transmitter means for producing pulses of high frequency oscillations and including antenna means for radiating and receiving said pulses, means coupled to said antenna for selecting said pulses after reflection with the reflected pulses having Doppler frequency components produced by relative movement between said antenna means and the reflecting object, first mixer means for reducing the frequency of the oscillations of the received pulses, second mixer means coupled to said transmitter means for reducing the frequency of the oscillations of the transmitted pulses, first delay means connected to said second mixer means, a first zero beat mixer having inputs connected to said first mixer means and to said first delay means for deriving the Doppler frequency components from reflected pulses which have a delay corresponding to the delay of said first delay means, second delay means connected to said first delay means, a second zero beat mixer having inputs connected to said first mixer means and to said second delay means for deriving the Doppler frequency components from reflected pulses which have a delay corresponding to the sum of the delays of said first and second delay means, first and

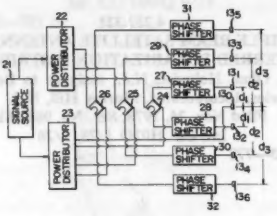
second bandpass filter means each including limiter means for providing gain control and connected to the outputs of said first and second zero beat mixers respectively for selecting the Doppler frequency components within a given band, multiplier means connected to said first and second filter means for multiplying the signals therefrom, low pass filter means connected to said multiplier means for selecting signals below a given frequency, and peak detector means connected to said low pass filter for producing an indication when the signals from said first and second bandpass filter means are of the same frequency.

4,232,316

AIRCRAFT LANDING-GUIDING APPARATUS

Eiichi Chaki, Kamakura; Taneaki Chiba, Yokohama, and Tetsuo Sato, Funabashi, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Nov. 29, 1978, Ser. No. 964,521
Claims priority, application Japan, Dec. 5, 1977, 52-145808
Int. Cl.³ H04B *7/00*
U.S. Cl. 343—108 R **6 Claims**



1. An aircraft landing-guiding apparatus comprising:

an antenna system constituted by a plurality of antenna elements arranged on the lateral side of a runway and aligned in a direction intersecting its course substantially at a right angle for radiating a sideband pattern and carrier pattern from both sides alike;

means for generating a sideband signal and carrier signal; and

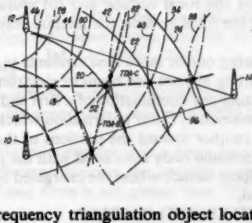
phase-shifting means coupled to each antenna element for shifting the phases of the sideband signal and carrier signal coupled thereto at a predetermined rate so as to cause the directionality of the sideband pattern and that of the carrier pattern to intersect the runway course at prescribed angles.

4,232,317

QUANTIZED HYPERBOLIC AND INVERSE HYPERBOLIC OBJECT LOCATION SYSTEM

Charles C. Freeny, Jr., P.O. Box 9811, Ft. Worth, Tex. 76107

Filed Nov. 1, 1978, Ser. No. 956,579
Int. Cl.³ G01S *5/06*
U.S. Cl. 343—112 R **15 Claims**



1. A radio frequency triangulation object location method for identifying the location coordinates of predetermined known geographical locations within a data base region wherein signals are transmitted via a vehicle unit for reception via at least three antennas, the method comprising the steps of:

positioning the vehicle unit at each of the known predetermined geographical locations within the data base region;

transmitting signals for reception by the antennas from the vehicle unit at each of the predetermined geographical locations; and

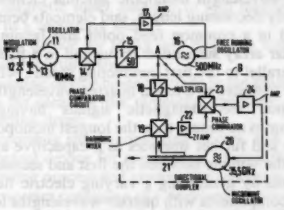
determining base location coordinates for each of the known predetermined geographical locations within the data base region in response to the signals transmitted via the vehicle unit at each of the predetermined geographical locations, wherein the signal strength of the signals received by each antenna exceeds a predetermined minimum level.

4,232,318

DUPLEX MICROWAVE RADIO COMMUNICATION SYSTEM

Friedbert Becker, Munich; Gunter Biethan, Neuried, and Peter Kloeber, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 29, 1978, Ser. No. 947,052
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1977, 2744110; Sep. 30, 1977, 2744127
Int. Cl.² H04L *5/14*
U.S. Cl. 370—29 **7 Claims**



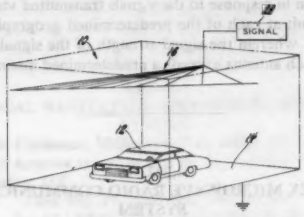
1. A duplex microwave radio system for the transmission of analog and digital data between movable transmitting and receiving stations which move along pre-given link paths and fixed transmitting and receiver stations which are arranged along these paths at known spacings and which are active for transmitting and receiving in both directions so that the stations of a link path are in communication with a central transmitting receiving station, characterized in that at least one of the movable or fixed stations has a transmitting branch with a modulation input (I) and with a microwave oscillator (3) which is used in common for the transmitting and receiving branches, a stabilization circuit (4) for said microwave oscillator and a microwave mixer (5), an amplifier and demodulator (6) in the receiving branch and a modulation output (II) produced by said receiving branch, characterized in that transmitting and receiving branches are coupled together with a circulator (7) having three arms, one of the arms connected to the transmitting branch and a second one of the arms connected to the receiving branch, a 3-dB-coupler (8) connected to the third one of said arms, two antennae which are displaced in radiation direction by 180° are connected to said 3-dB-coupler (8), and in addition to the received signal, a signal from the microwave oscillator (3), which is decreased by the decoupling attenuation of the circulator (7), is fed to said microwave mixer in the receiving branch to serve as a local oscillator signal and the output of said mixer supplied to said amplifier and demodulator and the output of said amplifier-demodulator connected to a master station with a signal cable.

4,232,319

BROADBAND TRANSMITTING ANTENNA FOR TEST CHAMBER

Richard E. Fusinski, Sterling Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 14, 1979, Ser. No. 75,700
Int. Cl.[3] H01Q *1/36;* G01R *29/08*
U.S. Cl. 343—703 1 Claim



1. A broadband transmitting antenna adapted for electromagnetic interference testing of objects within a test chamber of physical dimensions smaller than the quarter-wavelength of the longest wave signal transmitted, the antenna comprising, in combination:

first conducting means associated with the floor of said test chamber and effective to establish a ground plane thereat; and

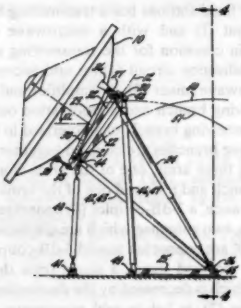
second conducting means comprising a plurality of tuned quarter-wavelength monopole antenna elements of progressively decreasing length, said elements being joined at one end in a common feed point and fanning out in a triangular array suspended above and in a plane substantially parallel to the first conducting means, whereby said antenna operates as a tuned quarter-wavelength array for transmitted electromagnetic signals having quarter-wavelengths no longer than the longest monopole antenna element and further operates as a capacitive antenna device in the volume between the first and second conducting means by generating a varying electric field therein having components with quarter-wavelengths longer than the longest monopole antenna element.

4,232,320

MOUNT FOR EARTH STATION ANTENNA

Rene Savalle, Jr., Tinley Park, Ill., assignor to Andrew Corporation, Orland Park, Ill.

Filed Apr. 21, 1978, Ser. No. 898,638
Int. Cl.[2] H01Q *3/08*
U.S. Cl. 343—765 8 Claims



1. A mount for an earth station antenna, said mount comprising

an hour angle beam supporting the antenna for pivotal movement of the antenna about an hour angle axis determined by the position of the hour angle beam and an adjustable azimuth strut connected to the antenna for pivoting the antenna about said hour angle axis,

a foundation on the earth's surface for supporting the antenna,

first and second pairs of struts pivotally supporting the hour angle beam at pivot points spaced from each other in the direction of the hour angle axis to permit adjustment of the hour angle axis so that the antenna can be pointed at a satellite, the lower ends of said first and second pairs of struts being pivotally connected to said foundation on horizontally spaced axes with the lower ends of the pair of struts connected to the lower pivot point on the hour angle beam being spaced farther away from the lower end of the hour angle beam than the lower ends of the other pair of struts, so that pivotal movement of the hour angle beam pivots the upper and lower ends of the hour angle beam along different arcs, and

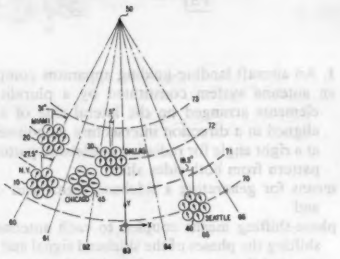
elevation adjusting means connected to the hour angle beam for adjusting said hour angle axis by pivoting the hour angle beam on said struts.

4,232,321

MULTIPLE BEAM SATELLITE ANTENNA WITH PREFERRED POLARIZATION DISTRIBUTION

Edward A. Ohm, Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 24, 1978, Ser. No. 963,461
Int. Cl.[2] H01Q *1/28, 3/26*
U.S. Cl. 343—778 7 Claims



1. In a satellite communications system, a method of transmitting electromagnetic energy from a satellite to a remote receiving area on the surface of a celestial body which results in a reduced amount of cross-polarization coupling along the transmission path, the satellite being in orbit directly above a subsatellite point (51) on the celestial body and comprises an antenna arrangement comprising (a) at least a main reflector aperture, a feed and a focal surface disposed transversely about the feed axis, the focal surface being comprised of a plurality of focal points, each of which corresponds to a respective point in the remote receiving area and a projection of the subsatellite point (50) on the focal surface and (b) plural feed elements disposed on the focal surface, the method comprising the step of:

(a) energizing one or more feed elements (e.g., 113, 114) for transmitting at least one beam of electromagnetic energy comprising any combination of a first and a second direction of essentially linear polarization which are orthogonal to one another toward the portions of the receiving area on the celestial body associated with the particular points on the focal surface where the energized feed elements are disposed,

CHARACTERIZED IN THAT

the method comprises the further step of:

(b) in performing step (a), energizing the one or more feed

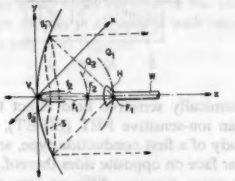
elements for transmitting the at least one beam of electromagnetic energy so that when the first direction of polarization is used by any particular one of the energized feed elements, the first direction is aligned parallel to a line on the focal surface connecting the corresponding subsatellite point and the point where the particular feed element is disposed (60-66), and when the second direction of polarization is used by any particular one of the feed elements, the second direction is aligned orthogonal to the line on the focal surface connecting the corresponding subsatellite point and the point on the focal surface where the particular feed element is disposed (70-73).

4,232,322

ANTENNA HAVING RADIATION PATTERN WITH MAIN LOBE OF GENERALLY ELLIPTICAL CROSS-SECTION

Salvatore De Padova; Enrico Pagana, both of Turin, and Giorgio Rosenga, Collegno, all of Italy, assignors to CSELT - Centro Studi e Laboratori Telecomunicazioni S.p.A., Turin, Italy

Filed Nov. 20, 1978, Ser. No. 961,943
Claims priority, application Italy, Nov. 25, 1977, 69656A/77
Int. Cl.³ H01Q *9/14*
U.S. Cl. 343—781 P **6 Claims**



1. An antenna having a radiation pattern with a main lobe of generally elliptical cross-section, comprising:

a reflector with a concave surface whose cross-sections in two mutually orthogonal planes substantially define segments of respective parabolas of different parameters p and q with $p \neq q$, said parabolas having a common vertex and different foci on a common axis passing through said vertex, said surface intersecting a plane transverse to said common axis in a generally elliptical curve; and

a source of microwaves trained upon said concave surface, said source being located with its phase center of radiation in a zone bounded by two imaginary spherical surfaces of respective radii p/2 and q/2 centered on said vertex and passing through said foci, thereby establishing a radiation pattern with a main lobe of generally elliptical cross-section.

4,232,323

MAGNETOGRAPHIC APPARATUS

Norio Kokaji, Hino; Kunio Kinoshita, Hachioji; Toshihiro Urano, Machida, and Katsunori Saito, Akikawa, all of Japan, assignors to Iwatsu Electric Co., Ltd., Japan

Filed Aug. 9, 1978, Ser. No. 932,310
Claims priority, application Japan, Aug. 16, 1977, 52-98106
Int. Cl.³ G03G *19/00*
U.S. Cl. 346—74.1 **17 Claims**

1. A magnetographic apparatus comprising:

(a) a device for generating a magnetic latent image pattern signal;

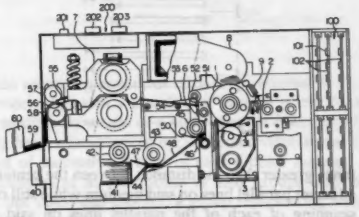
(b) a rotatable magnetic recording drum having a layer of metallic plating, wherein the specific resistivity of the surface of said drum is not greater than 10^{12} ohmcentimeter;

(c) a magnetic recording head for recording magnetic latent images having a magnetic field of predetermined strength on said drum in accordance with said magnetic latent image pattern signal;

(d) a developing device which supplies magnetic toner to said recording drum for developing said magnetic latent images into visible images formed by adhered toner, wherein said developing device comprises:

(i) a rotatable developing surface located adjacent the drum;

(ii) at least one magnet for developing a magnetic field to hold the toner on the developing surface, wherein the magnetic field of the magnet is sufficiently weak in the region where the developing surface is nearest the drum such that the magnetic field of the magnetic latent images attracts the the toner from the developing surface and the magnetic field of the magnet does not erase the magnetic latent images;



(e) a transferring device for electrostatically transferring said magnetic toner adhered to said magnetic latent images to a recording sheet;

(f) a fixing device for fixing said magnetic toner transferred to said recording sheet;

(g) a cleaning device having a blade in the shape of a metallic plate for cleaning the remaining magnetic toner on said recording drum;

(h) a recording sheets conveying device, and

(i) a control device for controlling a magnetic latent image recording process and causing the repetition of a sequence of processes consisting of a developing process, a transferring process, a process for fixing images and a process for conveying recording sheets whereby a plurality of individual copies of said magnetic latent image may be formed from a single magnetic image after said latent image is initially recorded on said drum.

4,232,324

APPARATUS FOR ARRANGING SCANNING HEADS FOR INTERLACING

Sherman H. Tsao, Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 5, 1978, Ser. No. 912,818
Int. Cl.³ G01D *15/18*
U.S. Cl. 346—75 **14 Claims**

1. A scanning apparatus including:

a medium to be scanned;

an array of a plurality of scanning elements for scanning said medium, said scanning elements being arranged in a single line in the indexing direction;

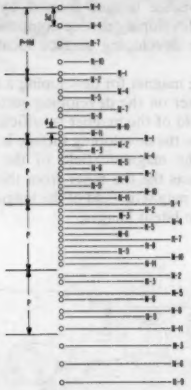
said scanning elements being spaced non-uniform distances from each other in the indexing direction;

one of said medium and said array having relative movement with respect to the other in a pass direction perpendicular to the indexing direction to cause scanning of substantially parallel lines on said medium;

one of said medium and said array having relative movement with respect to the other in the indexing direction so that each relative movement of said scanning elements and said medium in the pass direction starts a pitch distance from the prior start, the pitch distance being equal to the product of the total number of said scanning elements and the

distance between the centers of two adjacent parallel lines on said medium; and

said scanning elements being spaced from each other a distance greater than the distance between the centers of two adjacent parallel lines on said medium while still obtaining scanning of each of the parallel lines on said medium during a plurality of passes in the pass direction.



4,232,325

THERMAL PRINTING DEVICE WITH SPRING SUPPORT TINES

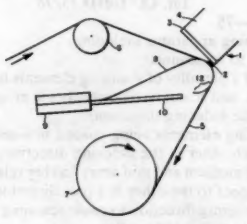
Michael Bradshaw, and Roger D. Edwards, both of Solihull, England, assignors to Leeds and Northrup Ltd., Birmingham, England

Filed Sep. 24, 1979, Ser. No. 77,965

Claims priority, application United Kingdom, Nov. 8, 1978, 43595/78

Int. Cl.³ G01D *15/10, 15/28*

U.S. Cl. 346—76 R **3 Claims**



1. Thermal printing device comprising an array of selectively energizable resistors, paper-feed means for advancing heat-sensitive paper over the array of resistors, and a resilient comb having a plurality of tines each of which, in operation, presses the paper locally against a number of the resistors.

4,232,326

CHEMICALLY SENSITIVE FIELD EFFECT TRANSISTOR HAVING ELECTRODE CONNECTIONS

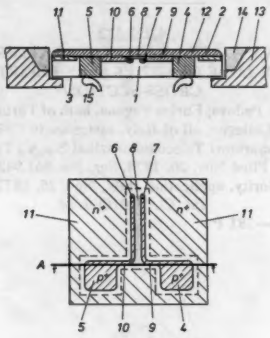
Arno Neidig, Plankstadt; Gerhard Popp, and Gabriele Gilbers, both of Lampertheim, all of Fed. Rep. of Germany, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Jul. 26, 1978, Ser. No. 928,309

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1977, 2736200

Int. Cl.² H01L *29/78, 29/34, 23/48*

U.S. Cl. 357—23 **5 Claims**



1. In a chemically sensitive field effect transistor (FET), particularly an ion-sensitive FET (ISFET), wherein a semiconductor body of a first conduction type, and having a front face and a rear face on opposite sides thereof, is provided with two diffusion zones, a source diffusion zone and a drain diffusion zone, which are spaced apart on and extend to a determined depth from said front face and which are formed of a second conduction type with opposite polarity to the first conduction type, and wherein said diffusion zones bound a channel and are connected to conductor paths which contact connection lines, said transistor having a stabilization layer on said front face, a chemically sensitive layer on said front face, and additional stabilization layers, particularly on the edges thereof, the improvement comprising:

said conductor paths connected to said diffusion zones formed of highly doped regions of the second conduction type; and

a pair of connection zones respectively connected to said diffusion zones through said conductor paths, said connection zones laterally offset relative to said diffusion zones and extending through said semiconductor body from the front face to the rear face thereof, said connection lines contacting said connection zones at said rear face;

whereby said connection lines are connected to said diffusion zones through said connection zones and said conduction paths.

4,232,327

EXTENDED DRAIN SELF-ALIGNED SILICON GATE MOSFET

Sheng T. Hsu, Lawrenceville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 13, 1978, Ser. No. 959,848

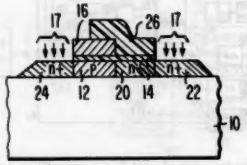
Int. Cl.² H01L *29/78*

U.S. Cl. 357—23 **3 Claims**

1. In an improved extended drain field effect transistor of the type including a body of semiconductor material in which spaced drain and source regions of a first conductivity type, with a given concentration of conductivity modifiers, are embedded at the surface of the body, the drain and source

regions spaced a given distance one from the other to define the channel region, a first layer of insulating material disposed over the channel region, and a gate member disposed on the first insulating layer over the channel region, the improvement comprising:

the portion of the channel region adjacent the source region having a second conductivity type opposite the first conductivity type;



the remainder of the channel region, adjacent the drain region, forming a drift region of the first conductivity type with a lower concentration of conductivity modifiers therein than the drain and source regions; and

the gate member is disposed solely over the channel region with the edges thereof in alignment with respective edges of the source and drift regions.

4,232,328

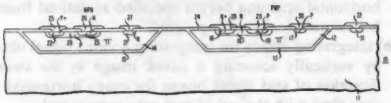
DIELECTRICALLY-ISOLATED INTEGRATED CIRCUIT COMPLEMENTARY TRANSISTORS FOR HIGH VOLTAGE USE

Adrian R. Hartman, New Providence; Terence J. Riley, Warren, and Peter W. Shackle, Bridgewater, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 20, 1978, Ser. No. 971,632

Int. Cl.³ H01L *27/04*

U.S. Cl. 357—49 **6 Claims**



1. A composite semiconductor device **10** for a high voltage integrated circuit having a plurality of pockets **12, 14** of monocrystalline semiconductor material of P conductivity type dielectrically isolated from each other by a layer of insulating material **13, 15** underlying the bottom and sides thereof, said pockets being supported in a layer **11** of polycrystalline semiconductor material and having a surface in a common plane of said device,

CHARACTERIZED IN THAT

(a) there is a first pocket **12** containing a pn*π*p transistor and a second pocket **14** containing a np*π*n transistor, and

(b) the semiconductor material of said pockets has a resistivity in the range of from about 75 ohm cm to about 300 ohm/cm.

4,232,329

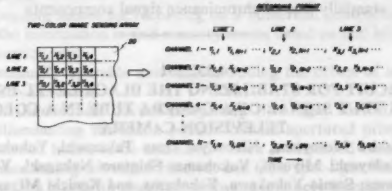
MULTICHANNEL RECORDING FORMAT FOR A SAMPLED-ANALOG COLOR VIDEO SIGNAL

Jerry R. Horak; Peter L. P. Dillon, both of Rochester, and Ronald R. Firth, Fairport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 3, 1978, Ser. No. 957,269

Int. Cl.³ A04N *5/76*

U.S. Cl. 358—9 **12 Claims**



5. Video recording apparatus of the type adapted to record a color video signal on a plurality of parallel tracks on a recording medium by means of a multi-channel essentially-fixed recording head, characterized by: said color video signal being composed of successive groups of analog color samples, successive samples in at least some of said groups alternating between one color and another, a group representing a line of a video frame or field, and said recording apparatus including means for separating a group, sample-by-sample, and assigning said samples to a plurality of channels of substantially equal bandwidth such that the samples carried by said channels comprise subgroups of samples of like color.

4,232,330

METHOD AND SYSTEM FOR SEPARATING THE CHROMINANCE AND LUMINANCE SIGNALS IN COLOR TELEVISION SIGNALS HAVING QUADRATURE-MODULATED CHROMINANCE SUBCARRIERS

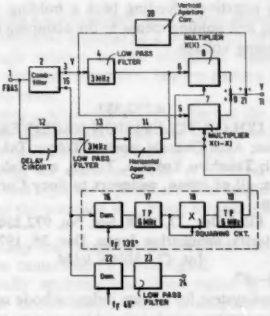
Jürgen Heitmann, Seeheim, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 2, 1979, Ser. No. 16,990

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1978, 2810697

Int. Cl.³ H04N *9/535*

U.S. Cl. 358—31 **20 Claims**



1. In a color television system having a composite color television signal including a luminance signal having high and low frequency components, a chrominance subcarrier, and chrominance signals quadrature-modulated on said chrominance subcarrier, a method for separating said luminance signal from said chrominance signals, comprising the steps of

filtering said composite color television signal to create a

low frequency and a main luminance signal having, respectively, only said low frequency components and at least said high frequency components of said luminance signal;

creating a correlation signal indicative of the degree of correlation between time sequential lines in said composite color television signal;

and combining said low frequency luminance signal and said main luminance signal in a ratio controlled by said correlation signal thereby creating a final luminance signal substantially free of chrominance signal components.

4,232,331

CIRCUIT FOR STABILIZING THE BLACK LEVEL IN AN OUTPUT SIGNAL OF A CAMERA TUBE IN A COLOR TELEVISION CAMERA

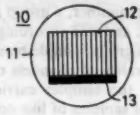
Koichiro Motoyama, Ninomiya; Itsuo Takanashi, Yokohama; Tadayoshi Miyoshi, Yokohama; Shintaro Nakagaki, Yokohama; Sumio Yokokawa, Yokohama, and Kenichi Miyazaki, Sagamihara, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Oct. 3, 1978, Ser. No. 948,253

Claims priority, application Japan, Oct. 4, 1977, 52/118553

Int. Cl.³ H04N *9/07, 5/16*

U.S. Cl. 358—44 **6 Claims**



1. A circuit for stabilizing a black level of an output signal of a camera tube in a color television camera in which said camera tube includes an optical filter means having an optically black part extending in parallel with a beam scanning direction of the camera tube, said stabilizing circuit comprising: a clamping circuit means for clamping at a clamping voltage an output signal of the camera tube during a horizontal beam blanking period and for restoring a DC component of the output signal; means responsive to a sampling pulse supplied every vertical scanning period within a scanning period of the black level signal portion corresponding to the optically black part of the optical filter means for sampling and holding an output signal of the clamping circuit means; and feedback circuit means for substantially negatively feeding back a holding voltage from said sampling and holding means to the clamping circuit means as said clamping voltage.

4,232,332

COLOR TELEVISION RECEIVER

Akira Toyama; Akio Ohkoshi, both of Tokyo; Takashi Toyama, Kokubunji; Takahiro Yukawa, Tokyo, and Takashi Hosono, Yokohama, all of Japan, assignors to Sony Corporation, Tokyo, Japan

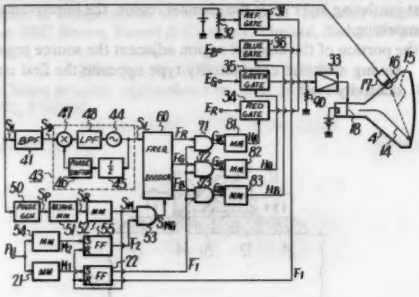
Filed Dec. 22, 1978, Ser. No. 972,236

Claims priority, application Japan, Dec. 26, 1977, 52-156915

Int. Cl.³ H04N *9/24*

U.S. Cl. 358—67 **17 Claims**

1. A control system for a beam index cathode ray tube of the type which generates an index signal in response to the position of a scanning electron beam comprising: means responsive to said index signal for generating a plurality of sequentially repeating color gating signals, means for providing gaps between at least some adjacent ones of said color gating signals, color gate means responsive to said color gating signals for sequentially gating a corresponding plurality of color signals for modulating the intensity of said electron beam, said gaps being effective to produce corresponding dips in said index signal, and means for detecting a phase of said dips with respect to said index signal and for controlling said color gating signals in response to said phase.



4,232,333

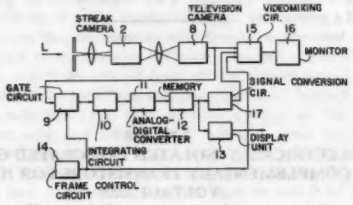
STREAK IMAGE ANALYZING DEVICE

Teruo Hiruma, and Yutaka Tsuchiya, both of Hamamatsu, Japan, assignors to Hamamatsu Terebi Kabushiki Kaisha, Shizuoka, Japan

Filed Jan. 5, 1979, Ser. No. 1,186

Int. Cl.³ H04N *5/32*

U.S. Cl. 358—93 **3 Claims**



1. A streak image analyzing device which comprises:

(a) gate means which is opened after a first predetermined time in an effective horizontal scanning period specified as desired from a horizontal synchronizing signal and is closed after a second predetermined time in said effective horizontal scanning period specified as desired from said horizontal synchronizing signal;

(b) integrating means for integrating a video signal obtained by vertically scanning a streak image in the sweeping direction of said streak image for every horizontal scanning time with the aid of said gate means; and

(c) memory means having memory positions in correspondence to scanning lines, for successively storing the integration value of said integrating means,

so that data stored in said memory means are outputted as relations between time and intensity.

4,232,334

COSMETIC APPARATUS AND METHOD

Evelyna C. Dyson, Guttenburg, N.J., assignor to Revlon, Inc., New York, N.Y.

Filed May 22, 1979, Ser. No. 41,536

Int. Cl.³ H04N *7/18;* **G03B** *21/26;* **G09B** *29/00;* **G09F** *9/30*

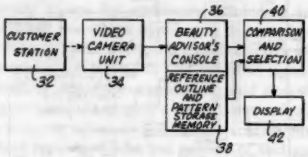
U.S. Cl. 358—93 **12 Claims**

1. A cosmetic apparatus for selecting a make-up pattern which best matches a customer's face and for displaying a mutually scaled and registered overlay of the selected make-up

pattern and at least an outline of the customer's face comprising:

means for providing an outline of the customer's face defined by a selected number of significant facial points having predetermined locations relative to an image of the customer's face;

means for storing a number of different reference face patterns each of which is similarly defined by a selected number of significant facial points having similar predetermined locations relative to reference faces, and for storing



a respective suitably scaled make-up pattern corresponding to each of said stored face patterns;

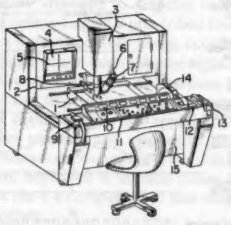
means for matching said outline of the customer's face with said stored reference face patterns to select the stored reference face pattern which most closely matches the customer's face;

means for displaying a mutually scaled and registered overlay of the make-up pattern corresponding to the so-selected reference face pattern and at least the so-provided outline of the customer's face.

4,232,335
NUMERICAL CONTROL TAPE PREPARATION MACHINE

Hiroshi Nakagawa, Katano; Hidetoshi Kawa, Ibaragi, and Makoto Kawai, Yahata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 13, 1978, Ser. No. 869,259
Claims priority, application Japan, Jan. 18, 1977, 52-4581
Int. Cl.³ H04N 7/18
U.S. Cl. 358—101 **5 Claims**



1. A numerical control tape preparation machine comprising:

a table upon which may be mounted an apertured printed circuit board wherein the locations of apertures therein are to be measured, said table being movable in two axial directions mutually perpendicular to each other and in an aperture viewing plane parallel to the table surface;

drive motors for driving said table along said two axes;

memory means for storing the displacement of said table along said axes;

a television camera unit installed at right angles relative to said table for receiving light reflected from said object to be measured, said camera unit having an optical system including an objective lens and a reticule having crossed and graduated lines and rotatably mounted in an image focusing plane of said objective lens, said image focusing plane being parallel to said aperture viewing plane and an eyepiece for simultaneously converting said printed circuit board apertures and said crossed and graduated lines into images;

an illumination device for directing/light toward said table surface to illuminate a part of said object to be measured;

a monitoring television receiver coupled to said television camera unit for displaying at least a portion of said apertured printed circuit board to be measured on an enlarged scale;

recording means for recording on a numerical control tape the information in said memory means based on said information; and

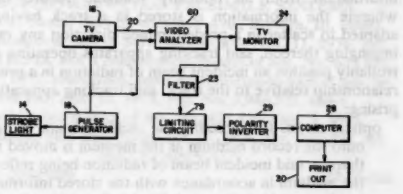
a manually operable unit for controlling the drives of said drive motors,

said illumination device comprising (i) a light source for illuminating the entire portion of said apertured printed circuit board to be measured which is displayed on said monitoring television receiver and (ii) a spot-light illumination means for simultaneously and intensely illuminating a desired region with a dot-like spot within said entire portion of said apertured printed circuit board which is displayed on said monitoring television camera.

4,232,336
INSPECTION OF ELONGATED MATERIAL

James W. Henry, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 18, 1978, Ser. No. 943,511
Int. Cl.³ H04N 7/18
U.S. Cl. 358—106 **10 Claims**



1. The method of inspecting elongated material such as strands, sheets, bundles or webs for surface variations which comprises the steps of

(a) moving said elongated material along a predetermined path,

(b) positioning a stroboscopic light source adjacent the path of said elongated material so it will direct its illumination at an angle relative to said elongated material causing surface variations thereof to make a pattern of light and shadowed areas,

(c) positioning a television camera adjacent the path of said elongated material such that the illuminated portion of said material will be in its field of view,

(d) generating an electrical pulse at selected intervals to activate said light for a predetermined length of time and to trigger the scanning of a frame by said television camera,

(e) converting the image of the frame developed by said television camera into a video signal,

(f) electrically applying said video signal to the input of separator circuit means which is adapted to produce a control pulse on its output terminal of predetermined duration for each horizontal synchronization pulse contained in said video signal,

(g) electrically applying the video signal and the control pulse from the separator circuit means to separate input terminals of gate means adapted to pass said video signal through to its output terminal whenever said control pulse is applied to said second input terminal,

(h) electrically applying the output signal from said gate means to comparator means for converting all pulses of greater than a predetermined amplitude contained within said passed video signal into a digitized signal, and

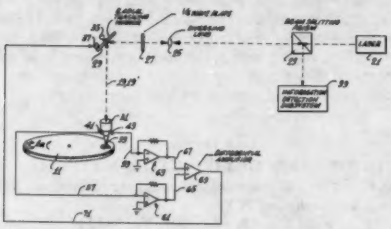
(i) using the digitized signal as a source of information in the inspection of said elongated material.

4,232,337

METHOD AND APPARATUS FOR TRACKING AN OPTICALLY READABLE INFORMATION TRACK

John S. Winslow, Altadena, and Richard L. Wilkinson, Torrance, both of Calif., assignors to MCA Discovision, Inc., Universal City, Calif.

Filed Dec. 13, 1978, Ser. No. 968,739
Int. Cl.³ H04N *5/76, 3/02*
U.S. Cl. 358—128.5 **21 Claims**



1. Tracking apparatus for use in a system for recovering information from an optically readable record medium, wherein the information is stored in a track having sides adapted to scatter in a predetermined direction any radiation impinging thereon, said tracking apparatus operating to controllably position an incident beam of radiation in a prescribed relationship relative to the track, said tracking apparatus comprising:

optical means for directing the incident beam of radiation onto the record medium as the medium is moved relative thereto, said incident beam of radiation being reflected by the medium in accordance with the stored information to produce an intensity-modulated reflected beam of radiation;

said optical means further operating to direct the reflected beam of radiation to information recovery means for detecting the modulated intensity thereof;

means, separate from the information recovery means, for detecting radiation scattered by the sides of the track, to produce an error signal indicative of the position of the incident beam of radiation relative to the centerline of the track; and

means responsive to the error signal for controllably positioning the incident beam of radiation in the prescribed relationship relative to the track.

4,232,338

METHOD AND APPARATUS FOR VIDEO SIGNAL ENCODING WITH MOTION COMPENSATION

Arun N. Netravali, Matawan, and John D. Robbins, Aberdeen, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

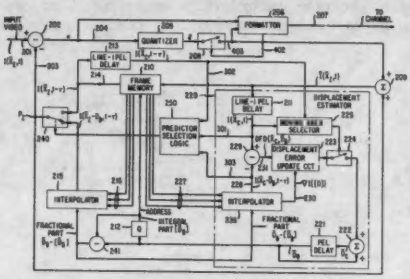
Filed Jun. 8, 1979, Ser. No. 46,953
Int. Cl.³ H04N *7/12*
U.S. Cl. 358—136 **18 Claims**

1. Apparatus for encoding a video signal including a plurality of samples each representing the intensity of an element of a picture, including:

means (220) for estimating the displacement of objects in said picture which occur between the present frame and a previous frame;

first means (210, 226) for predicting the intensities of a set of previously processed ones of said pels based upon the intensities at displaced locations in said previous frame determined by said estimates;

second means (210, 213) for predicting the intensities of said first set of pels based upon the intensities of the spatially corresponding locations in said previous frame;



means (250) for computing first and second sums of the prediction errors associated with predictions made by said first and second means using displaced frame difference and frame difference techniques, respectively; and

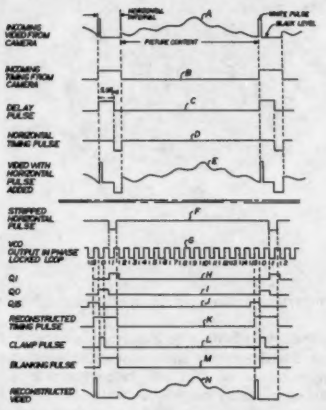
means (240) responsive to said computing means for predicting the intensity value of the present pel using the one of said prediction techniques which has the smaller prediction error sum.

4,232,339

TELEVISION SIGNAL HORIZONTAL INTERVAL TIMING RECONSTRUCTION SYSTEM

Charles F. Smiley, and Billy G. Zachum, both of Quincy, Ill., assignors to Harris Corporation, Cleveland, Ohio

Continuation of Ser. No. 768,098, Feb. 14, 1977, abandoned. This application Sep. 8, 1978, Ser. No. 940,553
Int. Cl.³ H04N *5/06, 5/04*
U.S. Cl. 358—150 **5 Claims**



4. In a television camera system wherein a camera head generates at least one video signal and a timing signal, with said at least one video signal comprising regularly occurring video information intervals containing information representing a video image and blanking intervals separating said video information intervals, said blanking intervals each containing at least one time slot having a reference signal level therein, and

with said timing signal comprising a periodic train of pulses occurring in timed relation to said blanking intervals of said at least one video signal, where said timing and video signals are to be communicated over a multichannel transmission link to a remote camera control unit, apparatus for communicating said video and timing signals over only a single channel of said multichannel transmission link, comprising:

modifying means for modifying the pulses of said timing signal so as to provide a periodic modified signal which may be additively combined with said video signal without altering said video information or said reference signal level;

combining means for additively combining said modified signal and said video signal so as to provide a sum signal having a periodic portion with a distinctive amplitude and corresponding in time to said modified signal;

transmitting means for transmitting said sum signal to said camera control unit over a single communication channel;

pulse stripping means at said camera control unit responsive to said periodic distinctive portion of said sum signal for regenerating said modified signal therefrom; and,

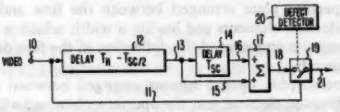
reconstructing means at said camera control unit responsive to said sum signal and to said regenerated modified signal for reconstructing said video and timing signals therefrom.

4,232,340

DEFECT COMPENSATION FOR COLOR TELEVISION

Jack S. Fuhrer, Carmel, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Jun. 1, 1979, Ser. No. 44,532
Int. Cl.³ H04N 5/76
U.S. Cl. 358—167 **7 Claims**



1. A defect compensation circuit of the type which substitutes a delayed signal for real-time signal defects, including a signal delaying means arranged to respond to the real-time signals to provide a delayed signal a prescribed time thereafter, a defect detection means responsive to the occurrence and to the absence of signal defects in said real-time signal for generating first and second control signal manifestations respectively, an output terminal and first switch means responsive to said first control signal manifestations for applying the real-time signal to said output terminal and responsive to said second control signal manifestations for applying the delayed signal to said output terminal, improved to include means for avoiding undesirable shifts in the d-c component at said output terminal, which means comprises:

means for tracking and retaining the d-c component of the real-time signal applied to said output terminal during said first control signal manifestations and for continuing to apply this d-c component to said output terminal to the exclusion of the d-c component of the delayed signal during said second control signal manifestations.

4,232,341

IMAGE DISPLAY APPARATUS

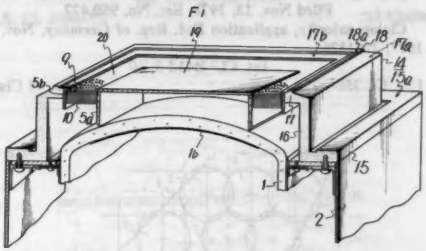
Toshiro Watanabe, Zushi, and Koji Suzuki, Yokohama, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 8, 1978, Ser. No. 958,640
Claims priority, application Japan, Nov. 11, 1977, 52/135941
Int. Cl.³ H04N 5/72, 5/64
U.S. Cl. 358—250 **10 Claims**

10. An image display apparatus comprising:

a cathode ray tube having a phosphor screen on which an image is to be formed;

main image display means for displaying said image on said screen of said cathode ray tube without substantial reduction in resolution of said image; and



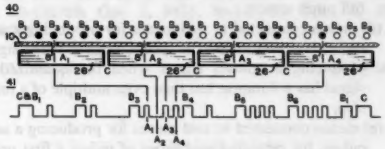
moderated image display means having light scattering means for displaying a peripheral part of said image on said screen but with a reduction in resolution of said image.

4,232,342

MULTIPLEXING FOR FACSIMILE SYSTEMS

Stephen F. Skala, 3839 S. Wenonah Ave., Berwyn, Ill. 60402

Continuation-in-part of Ser. No. 740,805, Nov. 11, 1976, Pat. No. 4,117,518, and a continuation-in-part of Ser. No. 608,089, Aug. 27, 1975, abandoned, and a continuation-in-part of Ser. No. 350,943, Apr. 13, 1973, Pat. No. 3,943,525, and a continuation-in-part of Ser. No. 421,425, Dec. 3, 1973, abandoned. This application Jul. 17, 1978, Ser. No. 925,389
Int. Cl.³ A04N 1/22
U.S. Cl. 358—296 **13 Claims**



3. A method for generating a signal in a facsimile system having scanning elements and printing elements in a linear array and grouped into segments along a line for simultaneous operation of each said group comprising the steps of

scanning a document line by means of a plurality of scanning elements grouped to correspond to a plurality of contiguous segments of the document line,

developing an amplitude from each said group of scanning elements, each said amplitude corresponding to light reflected from an elemental area of one of the segments,

sampling sequentially in a predetermined order each said amplitude thereby generating a time division multiplexed sequence of amplitudes from amplitudes present simultaneously,

transforming the sequence of amplitudes into a signal having a similar sequence of corresponding amplitudes for transmission through a channel to a graphic receiver to control the printing elements for a facsimile reproduction of the scanned elemental areas.

4,232,343

METHOD AND APPARATUS FOR RECORDING GRAPHIC OR IMAGE INFORMATION BY MEANS OF PUNCTIFORM RECORDING SPOTS

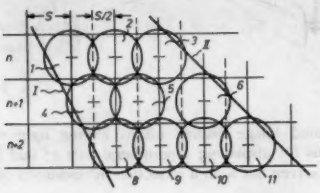
Rüediger Sommer, Raisdorf, Fed. Rep. of Germany, assignor to Dr. Ing. Rudolf Hell GmbH, Fed. Rep. of Germany

Filed Nov. 13, 1978, Ser. No. 959,427

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1977, 2751326

Int. Cl.[2] B41J *3/10*

U.S. Cl. 358—296 8 Claims



1. An apparatus for recording graphic or image information derived from a video signal source by means of punctiform recording spots that are arranged, line-by-line according to a recording grid or multi-lined within a matrix, and the recording effected, step-by-step, with a recording frequency corresponding to the fixed point intervals or pitch of the grid or matrix, comprising

(a) means, including a pulse generator having a frequency of a fraction of said recording frequency and representing fractional pitch-steps,

(b) means connected to said video signal source and the pulse generator for quantizing said video signal with respect to such pulses,

(c) means connected to said video signal source and the pulse generator for producing a series of pulses, the duration of each pulse being approximately equal to the duration of a full pitch step,

(d) means connected to said means for producing a series of pulses and said means for quantizing the video signal for producing a control signal when the quantized video signal has a duration less than even multiple of a full pitch step,

(e) means connected to said means for producing a series of pulses, for retarding said series of pulses a first predetermined number of fractional pitch steps and for retarding said series of pulses a second predetermined greater number of fractional pitch steps,

(f) means connected to said means for producing a control signal, for retarding said control signal with said greater number of fractional pitch steps and for inverting said retarded control signal,

(g) an output for generating the recording signal for the punctiform recording and

(h) means connected to said output and said means for retarding and inverting the control signal and said means for retarding said series of pulses for supplying to said output as recording signals

either the series of pulses, retarded with said second greater number of fractional pitch steps if no control signal is generated by said means for generating the control signal

or the series of pulses retarded with said second greater number of fractional pitch steps without the last pulse of said series and with an additional pulse retarded with one fractional pitch step.

4,232,344

DEVICE FOR REPRODUCING A HALFTONE PICTURE BY SCANNING

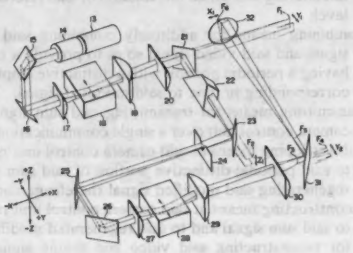
Seiya Sakamoto, Kyoto; Tetsuo Hohki, Ibaragi, and Isao Saito, Shiga, all of Japan, assignors to Dainippon Screen Seizo Kabushiki Kaisha, Kyoto, Japan

Filed Nov. 28, 1978, Ser. No. 964,189

Claims priority, application Japan, Dec. 6, 1977, 52-145683

Int. Cl.[3] H04N *1/22*

U.S. Cl. 358—298 11 Claims



1. A device for reproducing a halftone picture by scanning, wherein a recording light beam to be projected on a photo-sensitive material is suitably controlled by means of picture signals obtained from the scanning of an original picture, comprising:

a light source for the recording light beam;

a first deflection element adapted to deflect the light beam selectively in a certain direction;

a second deflection element adapted to deflect the light beam selectively in a direction orthogonal to the deflecting angle of the first deflection element;

an aperture plate arranged between the first and second deflection elements and having a width which is reduced along the direction of the deflection of the first deflection element;

an anamorphic optical system arranged between the first deflection element and the aperture plate and adapted to flatten the beam so as to reduce its cross sectional dimension orthogonal to the direction in which it is deflected by the second deflection element;

an optical system for focusing the light beam from the second deflection element onto the photosensitive material; and

control means for controlling deflection angles at the first and second deflection elements so as to change the width of the light beam in cooperation with said aperture plate and to shift the center of the light beam so as to allow it to be in the center of each halftone dot, both in accordance with the picture signals.

4,232,345

APPARATUS FOR PRODUCING A SEAMLESS COPY FROM AN UNJOINTED ORIGINAL

Peter M. Zollman, Walton-on-Thames, and Keith G. Doyle, Sunbury-on-Thames, both of England, assignors to Zed Instruments Limited, Surrey, England

Continuation-in-part of Ser. No. 928,410, Jul. 27, 1978, abandoned, which is a continuation of Ser. No. 805,980, Jun. 13, 1977, abandoned. This application Dec. 8, 1978, Ser. No. 967,841

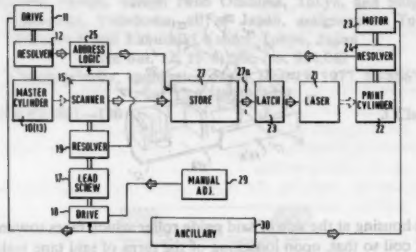
Claims priority, application United Kingdom, Jun. 11, 1976, 24350/76; Jun. 23, 1976, 26126/76

Int. Cl.[3] H04N *1/22, 1/26, 1/38*

U.S. Cl. 358—299 17 Claims

1. Copying apparatus for producing a seamless copy from an unjointed original having leading and trailing edges separated by a gap, said apparatus comprising: a first rotary carrier for carrying an original and a second rotary carrier including a copy surface; a "read" scanning means movable relative to the first carrier for scanning the original on the first carrier; a laser;

means for passing the information from the "read" scan to said laser to modulate the output of the laser; means for causing relative movement between the modulated laser output and the second carrier so as to perform a "write" scan to transfer a pattern derived from the "read" pattern to the copy surface; said means for passing information including a store for storing



data obtained in scanning the original; means for measuring the circumferential length of the original when on the first carrier; and store-controlling means connected to the output of the measuring means and effective to control the store in accordance with the measuring means output to ensure that each scan of the second carrier is filled by data from the original outside the gap.

4,232,346

APPARATUS FOR REPEATED REPRODUCTION OF INTELLIGENCE ON SELECTED PORTIONS OF MAGNETIC TAPE

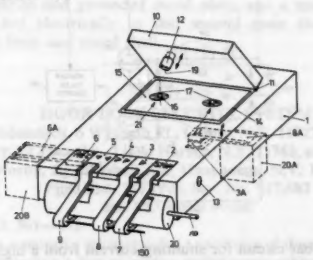
Richard Kobler, Oberägeri, Switzerland, assignor to Edith Kobler, Oberägeri and Ernst Frey, Unterägeri, both of, Switzerland

Filed Aug. 28, 1978, Ser. No. 937,211

Claims priority, application Switzerland, Aug. 31, 1977, 10634/77

Int. Cl.³ G11B *15/18, 15/06, 19/18*

U.S. Cl. 360—71 **42 Claims**



1. An apparatus for controlling the forward and backward movement of an intelligence storing mobile carrier in a machine for recording and reproducing the intelligence, characterized by a single user-actuatable switch operative for controlling, during an initial reproduction, the selection of the carrier of any desired start position and any desired end position of a portion of a selectable length to be repeatedly reproduced, and means for causing the carrier repeatedly to move between the selected start and end positions subsequent to the actuation of said single switch.

4,232,347

VIDEO TAPE CONTROL TIME CODE READING

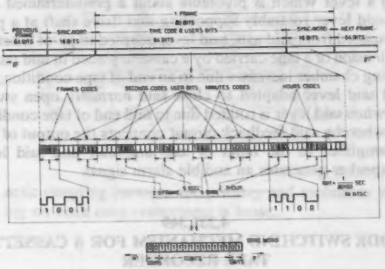
Katsuichi Tachi, Kawasaki, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 15, 1978, Ser. No. 960,856

Claims priority, application Japan, Nov. 18, 1977, 52-138756

Int. Cl.² G11B *15/52*

U.S. Cl. 360—73 **15 Claims**



2. A method for distinguishing between first and second different control time codes having at least frame codes which identify repeating sequences of contiguous frame numbers therein reproduced from a video magnetic tape containing video signals recorded thereon, comprising the steps of:

sensing the presence and absence of predetermined frame numbers in the reproduced control time code; and

detecting in dependence on the presence and absence of said predetermined frame numbers, whether said reproduced control time code is said first or said second control time code.

4,232,348

TAPE END WARNING APPARATUS

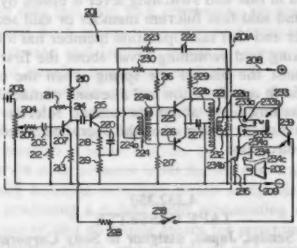
Ken Satoh, and Tuneo Yanagida, both of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Division of Ser. No. 713,344, Aug. 11, 1976, Pat. No. 4,157,575. This application Nov. 13, 1978, Ser. No. 959,574

Claims priority, application Japan, Aug. 19, 1975, 50-113951; Aug. 22, 1975, 50-115878; Aug. 22, 1975, 50-115879; Oct. 3, 1975, 50-135385; Oct. 3, 1975, 50-135386; Dec. 17, 1975, 50-168208

Int. Cl.³ G11B *15/06, 23/30*

U.S. Cl. 360—74.1 **8 Claims**



1. A tape end warning apparatus for use in a tape recorder of the type which includes an audio amplifier, a loud speaker, a first switch for connecting an output of said amplifier to said loudspeaker when said tape recorder is in a playback mode and for disconnecting said output of said amplifier to said loudspeaker when said tape recorder is in a record mode, a tape cassette receiving chamber, a drive shaft extending into said receiving chamber and adapted to engage a drive shaft recess in a tape cassette when a tape cassette is placed within said

receiving chamber, and drive means for driving said drive shaft, said tape end warning apparatus comprising:

a feedback circuit, including a normally open switch, forming an electrical feedback path between said output and an input of said amplifier when said normally open switch is closed;

an end tape detecting means for closing said normally open switch when an end of tape condition is detected, said end of tape detecting means including:

(1) a lever which is pivotable about a predetermined axis, said lever rotatably supporting said drive shaft at a point spaced from said axis, said lever adapted to pivot when the tension of a tape carried by a cassette placed in said receiving chamber increases due to an end of tape condition; and

(2) said lever adapted to close said normally open switch when said lever is rotated due to said end of tape condition whereby said feedback circuit connects the output of said amplifier to the input of said amplifier and said loudspeaker generates an audible alarm signal.

4,232,349

MODE SWITCHING MECHANISM FOR A CASSETTE TAPE RECORDER

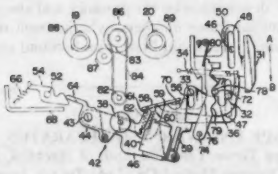
Minoru Kobayashi, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Apr. 10, 1979, Ser. No. 28,897

Claims priority, application Japan, Apr. 20, 1978, 53/46838

Int. Cl.[2] G11B *5/54, 21/22*

U.S. Cl. 360—105 **9 Claims**



1. A mode switching mechanism for a cassette tape recorder, comprising a first fulcrum member and a second fulcrum member, a rockable support lever supporting a pinch roller and a magnetic head, an operation member slidable from neutral position in either of opposite directions, a switching lever which is rocked when the operation member is slid in either direction, so as to rock the support lever from stop mode position into record mode position or play mode position, characterized in that said switching lever is biased by a spring to rock around said first fulcrum member or said second fulcrum member and that said operation member has a first contact for rocking said switching lever about the first fulcrum member against the bias of the spring when the operation member is slid in one direction and a second contact for rocking said switching lever about the second fulcrum member against the bias of the spring when the operation member is slid in the other direction.

4,232,350

TAPE CASSETTE

Teruo Ohta, Sendai, Japan, assignor to Sony Corporation, Tokyo, Japan

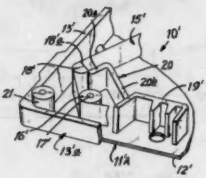
Filed Mar. 19, 1979, Ser. No. 21,615

Claims priority, application Japan, Mar. 20, 1978, 53-30995

Int. Cl.[3] G11B *23/08*

U.S. Cl. 360—132 **12 Claims**

1. In a tape cassette comprising a housing, a coil of wound tape rotatable in said housing, and guide means including a guide roller disposed in said housing and being engaged by tape extending from said coil and passing said guide roller at the side thereof facing away from said coil, a guide pin and a bracket guide engaged with said tape at locations therealong which are respectively upstream and downstream from said guide roller considered in respect to the direction of movement of said tape from said coil, with the tape also passing said guide pin at the side of the latter which faces away from said coil; the improvement which comprises an L-shaped shield member extending between said bracket guide and said guide pin within



said housing at the side of said guide roller which faces toward said coil so that, upon loosening of the turns of said tape making up said coil, said shield member prevents contact of said guide roller with the outermost loosened turn, said shield member having angularly related arms which include an acute angle therebetween opening generally toward said guide roller.

4,232,351

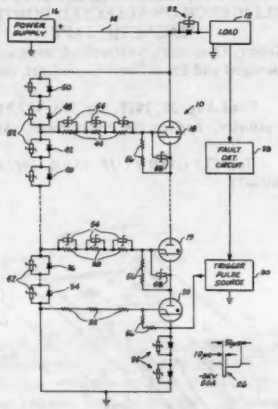
HIGH-VOLTAGE CROWBAR CIRCUIT WITH CASCADE-TRIGGERED SERIES IGNITRONS

William R. Baker, Orinda, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 3, 1979, Ser. No. 740

Int. Cl.[3] H02H *9/04*

U.S. Cl. 361—56 **16 Claims**



1. A crowbar circuit for shunting current from a high voltage level to a low voltage level, comprising:

a first triggerable high voltage current conducting device for connection to the high-voltage level;

a second triggerable high voltage current conducting device for connection between the low-voltage level and said first device;

a trigger pulse source for generating a trigger pulse; and

passive means responsive to the trigger pulse from said source for triggering said second device to conduct, said responsive means being operable upon conduction of said second device to apply substantially the full trigger pulse

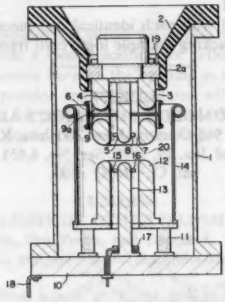
to said first device for triggering said first device to conduct.

4,232,352

PROTECTIVE GAP DEVICES FOR PROTECTING CIRCUIT BREAKERS

Shinichi Menju, Atsugi; Iwao Ohshima, Tokyo, and Shigeru Takahashi, Yokohama, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 12, 1978, Ser. No. 924,069
Claims priority, application Japan, Jul. 19, 1977, 52-85670
Int. Cl.³ H02H 3/22
U.S. Cl. 361—120 **3 Claims**



1. A protective gap device for protecting a circuit breaker comprising a cylindrical metal shell filled with an arc extinguishing medium; a high voltage electrode unit including a first main electrode supported by an insulating member which is arranged to close one end of said shell, a first trigger electrode secured to said first main electrode, and a ring-shaped metal member surrounding said first main electrode and connected electrically to said first trigger electrode through conductors which extend through a plurality of holes provided in said first main electrode; and a low voltage electrode unit including a second trigger electrode secured to a grounded metal plate closing the other end of said shell, a second main electrode attached to said grounded metal plate, and a metal cylinder connected electrically to said second main electrode and spaced from said metal shell.

4,232,353

DOOR LOCK SECURITY SYSTEM

Roger Mosciatti, 6 Wycomb Pl., Coram, N.Y. 11727; Thomas P. Foley, 12 Janes La., Lloyd Harbor, N.Y. 11743, and Frederick G. Moritz, 20 Aberdeen Rd., Hauppauge, N.Y. 11787

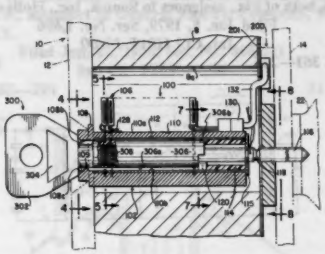
Filed Jun. 19, 1978, Ser. No. 917,082
Int. Cl.³ E05B 49/00
U.S. Cl. 361—172 **49 Claims**

1. In a security apparatus for a mechanical door lock of the type including a key-receiving cylinder rotatably mounted in said lock and coupled by means of a mechanical linkage to lock and unlock said lock upon being rotated, a cylinder assembly comprising:

a main body adapted to be mounted in said lock in place of said key-receiving cylinder;

means on said main body adapted to receive and engage a combination encoding key for mechanically coupling the rotation of said key to said mechanical linkage; and

a plurality of sensor elements mounted on said body, each sensor element including a primary and secondary winding and a core component made of low reluctance material, on which said windings are wound, each core component having a gap therein which causes said core component to have a high reluctance, whereby the electromagnetic coupling between the primary and secondary winding on each core component is loose.

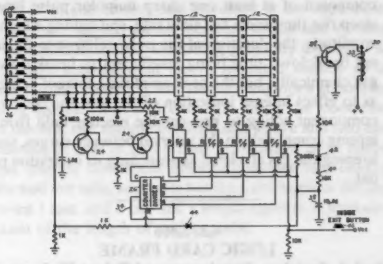


4,232,354

ELECTRICALLY ACTUATED LOCK FOR A DOOR OR SIMILAR ACCESS MEANS

Rand W. Mueller, and Daniel L. Stec, both of 41400 Executive Dr., Mt. Clemens, Mich. 48045

Filed Jan. 2, 1979, Ser. No. 85
Int. Cl.³ E05B 49/00
U.S. Cl. 361—172 **4 Claims**

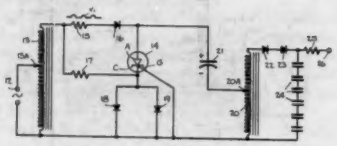


1. In an electrically actuated lock for a door or similar access means having an opening input combination of a multiple number of data bits, said lock comprising latching means for securing said door, means upon electrical stimulation thereof for withdrawing said latching means to release said door, a plurality of transfer means, one such transfer means for each data bit, each transfer means for receiving first and second inputs responsive to an actuator input and having an output responsive to both said first and second inputs, said transfer means connected in series wherein the output of one transfer means serves as an actuator input for the next transfer means, individually actuated switching means accessible to the lock user for producing a pulsed input representing a data bit, a selected one of said switching means for providing the inputs to each transfer means, and the last of said series connected transfer means associated with said withdrawing means wherein the output thereof causes said electrical stimulation of the withdrawing means and release of said door, each switching means being associated with a pulse generator and counter means for sending a selected number of input pulses to said transfer means, said selected number being equal to the number of data bits in said combination, and means for rendering the counter of said pulse generator and counter means inoperable after said selected number of pulses has been sent to said transfer means.

4,232,355
IONIZATION VOLTAGE SOURCE

Richard H. Finger, Hollywood, and Thomas J. Michel, Miami Lakes, both of Fla., assignors to Santek, Inc., Hollywood, Fla.

Filed Jan. 8, 1979, Ser. No. 1,696
Int. Cl.[2] H01T *19/00*
U.S. Cl. 361—235 11 Claims



1. A voltage source adapted to apply voltage excitation to a gas-ionization electrode in a wave form resulting in the generation of copious amounts of ionized gas without, however, producing substantial amounts of undesirable chemical by-products, the time required to produce incipient dielectric breakdown resulting in said byproducts being greater than that required to effect ionization of the gas, said gas having a predetermined ionization potential, said source comprising:

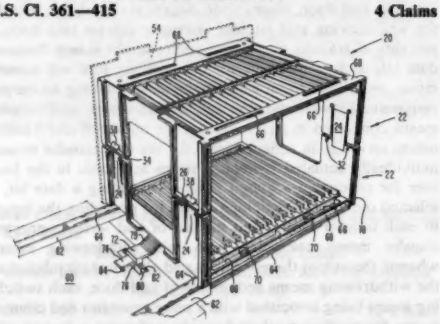
A means to produce a unipolar voltage wave having a steady state direct-current component which is below said ionization potential yet at a level serving to create an electric field conducive to subsequent gas-ionization; and

B means to impose a gas-ionization component on the steady state component in the form of periodic surges which are separated by relatively long intervals, each surge being composed of at least one sharp unipolar pulse having a steep rise time and a fast slew rate, and having a high peak amplitude, the duration of the pulse relative to the incipient breakdown time being insufficient to break down the gas chemically, but the peak ampiitude thereof being such as to effect intense ionization of the gas, the steady state component acting to prevent the electric field from collapsing completely in the interval between surges, thereby keeping the gas at a level approaching its ionization potential.

4,232,356
LOGIC CARD FRAME

Michael A. Saunders, Farmington, and Robert W. Irwin, Livonia, both of Mich., assignors to Burroughs Corporation, Detroit, Mich.

Filed Feb. 7, 1979, Ser. No. 9,932
Int. Cl.[3] H05K *7/14*
U.S. Cl. 361—415 4 Claims



1. A logic card frame for housing removable printed circuit boards comprising:

a pair of identical one piece molded half frames integrally molded with a multiplicity of circuit board tracks for guiding an inserted printed circuit board;

a flexure, integrally molded with the printed circuit board track, that exerts opposing, sideways pressure on a side portion of the inserted printed circuit board in the circuit board track;

means for restricting vertical vibration of the inserted printed circuit board;

means for locking together the pair of identical one piece molded half frames to form the logic card frame;

a mounting base;

means on the mounting base for sliding the logic card frame from an inserted to a withdrawn position for exposing and servicing the housed printed circuit boards;

means for mounting the logic card frame in a slidable fashion on the sliding means;

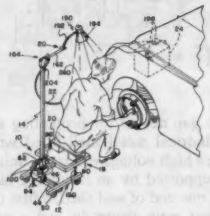
means for retaining the logic card frame in the inserted position; and

means, integral with each identical one piece molded half frame, for stacking multiple logic card frames.

4,232,357
AUTOMOBILE MECHANIC'S AID

Markus S. Dietz, 965 Country Acres, Wichita, Kans. 67212

Filed Jan. 19, 1979, Ser. No. 4,651
Int. Cl.[3] B60Q *1/00*
U.S. Cl. 362—61 14 Claims



1. An automobile mechanic's aid comprising a wheeled base and an upstanding support column fixed thereto, said base having at least three wheels defining at least three non-colinear points of support whereby the base is adapted to rest stably in an upright condition upon a horizontal supporting surface, a mounting bracket slidably mounted on the column for selective vertical positioning therealong, means for releasably retaining the bracket on the column at a selected vertical position, a tray carried by the mounting bracket for vertical movement therewith, an electric lamp means carried by the bracket for vertical movement therewith, and energization means for enabling selective electrical energization of the lamp from alternating current power mains and an electric battery, said energization means also being carried by the bracket for vertical movement therewith, whereby a mechanic can vertically position the bracket to place needed tools and lamp in convenient and illuminating positions relative to a portion of an automobile requiring his attention, with the lamp being energizable from such automobile if necessitated by remoteness from power mains.

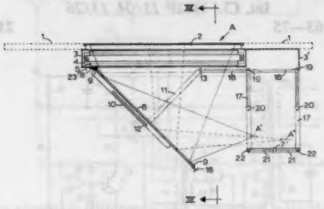
4,232,358
LIGHT FRAME FOR DRAFTING TABLE

Webb Nichols, 5 North Square, Boston, Mass. 02113

Filed Dec. 21, 1978, Ser. No. 971,746
Int. Cl.[3] G09F *13/04*
U.S. Cl. 362—97 13 Claims

1. A light frame for attachment to the underside of equipment having a flat top surface which has a light transmission portion, said frame comprising:

(a) a housing having an opening at the top for alignment with the light transmission portion;
(b) light source means attached to the housing;
(c) a mirror attached to the housing for reflecting light from the source through the opening in the housing;



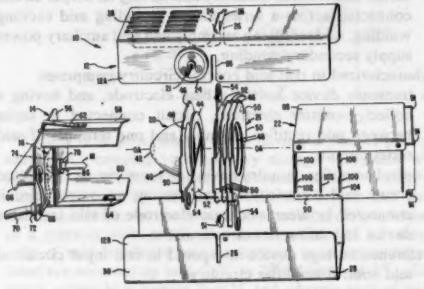
(d) means mounting the mirror for pivotal movement on the housing from a closed position for reflecting light from the light source through the opening in the housing, to a deployed position angularly inclined with respect to the top surface for projection and control of the shape of the images projected through the opening.

4,232,359

SPOTLIGHT OR OTHER ILLUMINATOR

Gordon T. Leon, San Pedro, and Joseph L. Byron, Burbank, both of Calif., assignors to Berkey-Colortran, Inc., Burbank, Calif.

Filed Apr. 9, 1979, Ser. No. 28,329
Int. Cl.³ F21V *7/00*
U.S. Cl. 362—268 **17 Claims**



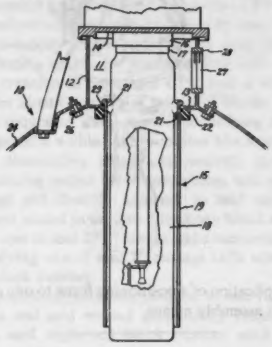
1. An illuminator including
a housing having an optical axis;
lamp support means removably mounted to said housing for selective movement and retention generally along said optical axis;
lamp focus means removably attached to said lamp support means and moveable with respect thereto for selective generally radial movement and retention with respect to said optical axis;
an illumination source attached to said lamp focus means;
lens holding assembly removably mounted to said housing for selective movement and retention generally along said optical axis;
one or more lenses removably mounted to said lens holding assembly, each lens independently moveable with respect to said housing and each other;
light output control means removably mounted in said housing and having an access opening to receive said illumination source.

4,232,360

HEAT RECOVERY HIGH INTENSITY DISCHARGE LAMP CONSTRUCTIONS

Himanshu B. Vakil, and Seth D. Silverstein, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 11, 1978, Ser. No. 868,531
Int. Cl.² F21V *29/00*
U.S. Cl. 362—294 **11 Claims**



1. A composite high intensity discharge lamp structure adapted for the recovery of heat emitted by such lamps comprising in combination a transparent longitudinally extending envelope formed with a closed end, means for mounting said lamp affixed to and closing said envelope at the opposite end theeof, arc tube support means mounted within said envelope, an arc tube affixed thereto extending generally axially of said envelope and a transparent sleeve mounted outside of and connected to said envelope, said sleeve being open at both ends and being spaced from said envelope along the coextensive lengths thereof, the volume between said sleeve and said envelope defining at least in part a zone providing a large convective heat transfer coefficient extending around said envelope opposite said arc tube, said zone having a thickness in the range of between 1 mm. and 2 cm. and a length equal to at least about 10 percent of the length of said arc tube.

4,232,361

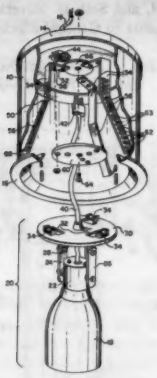
ADJUSTABLE LIGHT FIXTURE

Jeffrey C. Kelsall, Streamwood, Ill., assignor to McGraw-Edison Company, Rolling Meadows, Ill.

Filed Dec. 7, 1978, Ser. No. 967,367
Int. Cl.³ F21V *21/04*
U.S. Cl. 362—364 **5 Claims**

1. A lighting fixture comprising:
a hollow elongated housing having an open end and a closed end;
a plurality of elongated tracks mounted at one end to the closed end of said housing, a series of spaced protrusions disposed along said tracks;
a support plate receivable within said housing and movable along said tracks;
lamp assembly means mounted on said support plate;
rollers mounted on said support plate for engaging said protrusions;
said tracks being resilient and extending downwardly from the closed end of said housing and outwardly from the central axis of said housing, said tracks assuming a bias in a direction transverse to their length when deflected toward the central axis of said housing whereby said series of protrusions and said rollers form a series of overcenter

arrangements with each of said rollers selectively engagable between adjacent ones of said protrusions in response



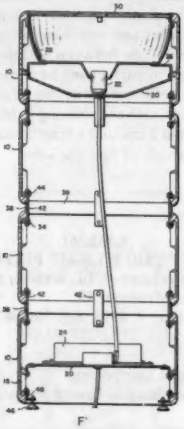
to the application of a positioning force to one of said plate and lamp assembly means.

4,232,362

FAMILY OF MODULAR LAMPS FOR INDIRECT LIGHTING

Thomas A. Williams, Wakefield, Mass., and Alfred O. Scholze, New Canaan, Conn., assignors to Lam, Inc., Wakefield, Mass.

Filed Oct. 5, 1978, Ser. No. 948,679
Int. Cl.³ F21S 1/12
U.S. Cl. 362—410 27 Claims



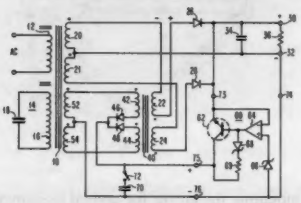
1. A free-standing modular lamp stand comprising an assembly of light modules of predetermined configuration arranged to be stacked in vertically-spaced relation with spacers positioned between modules of a horizontal section less than the horizontal section of the modules arranged in concentric relation to the modules such that there are outwardly-facing grooves between successive modules, said assembly including a module at the base upon which the lamp stand is designed to rest and a module at the top for providing lighting, said top module defining an upwardly-facing recess and a luminaire assembly mounted in said recess in a position to direct light upwardly through the top opening of the module at the top of the stack of modules.

4,232,363

AC TO DC CONVERTER WITH ENHANCED BUCK/BOOST REGULATION

Hobart A. Higuchi, and Sammy K. Yee, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 4, 1978, Ser. No. 965,828
Int. Cl.³ H02P 13/04, 13/26
U.S. Cl. 363—75 21 Claims



1. A closed loop potential regulated power supply circuit arrangement comprising

a power transformer having a primary winding, a principal power supply secondary winding and an auxiliary power supply secondary winding,

a rectifier assembly coupled to said principal power supply secondary winding,

an electric load connected to said rectifier assembly,

a compensating potential transformer having an exciting winding and having a pair of compensating windings individually interposed between the terminals of said principal power supply secondary winding and said rectifier assembly,

a rectifying assembly,

control circuitry having an input circuit connected directly across said rectifier assembly and having an output circuit connected across a series circuit including said exciting winding, said rectifying assembly and said auxiliary power supply secondary winding,

characterized in that said control circuitry comprises:

a transistor device having a base electrode, and having a collector-emitter electrode circuit connected in series between said rectifier assembly and one terminal of said series circuit,

control amplifier circuitry having an input circuit connected across said electric load and having an output circuit connected between said base electrode of said transistor device and said series circuit, and

reference voltage device interposed in said input circuit of said control amplifier circuitry.

4,232,364

ADAPTIVE SAMPLED-DATA CONTROLLER

Robert J. Bibbero, Merion Station, Pa., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 18, 1978, Ser. No. 970,738
Int. Cl.³ G05B 13/02, 21/02
U.S. Cl. 364—105 8 Claims

7. A method for controlling a parameter of a process variable in which a controller compares the parameters with a setpoint value and produces an output controller signal proportional to the difference between the parameters and the setpoint, including the steps of:

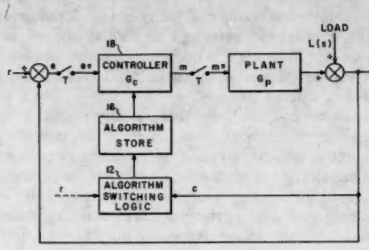
sampling the value of the setpoint at predetermined intervals;

storing the sample setpoint values;

adding each sample value to a previously sampled value in order to obtain an algebraic difference therebetween;

comparing said algebraic difference with a predetermined criteria; and

selecting one of a plurality of stored algorithms for use by the controller on the basis of the result of the step in which



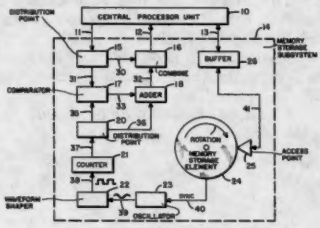
the algebraic difference was compared with the predetermined criteria.

4,232,365

APPARATUS FOR DETERMINING THE NEXT ADDRESS OF A REQUESTED BLOCK IN INTERLACED ROTATING MEMORIES

Robert M. Englund, Golden Valley, Minn., assignor to Sperry Corporation, New York, N.Y.

Filed Mar. 1, 1978, Ser. No. 882,491
Int. Cl.³ G06F *13/04;* G11C *8/00*
U.S. Cl. 364—200 **4 Claims**



1. In a data processing system having a central processor unit (CPU) coupled to a memory storage subsystem which contains an interlaced serial rotational memory storage element of capacity 2^M cells whose cells may be accessed only at such point in time as they rotate to a position directly adjacent to a memory storage element access point and wherein the cells of said interlaced serial rotational memory storage element are accessed by said CPU as 2^{M-N} blocks of 2^N cells per block, where M is greater than N, and wherein each of said 2^M cells is identified with a different corresponding one of 2^M addresses and each of said 2^M addresses contains a block number identifying a one of said 2^{M-N} blocks and a word number identifying a one of said 2^N cells within the block identified by said block number, wherein said 2^{M-N} blocks are arranged such that said 2^{M-N} cells of each of said 2^{M-N} blocks are equally spaced about the entire rotation of said interlaced serial rotational memory storage element, and having a means responsively coupled to said interlaced serial rotational memory storage element for maintaining a one of said 2^M cells currently directly adjacent to said memory storage element access point, whereby said one of said 2^M addresses so maintained changes with the rotation of said memory storage element, and having a first transferring means responsively coupled to said memory storage subsystem and said CPU for transferring from said CPU to said memory storage subsystem an address corresponding to a one of the 2^N cells within a desired one of said 2^{M-N} blocks to be accessed by said CPU, and having a means responsively coupled to said maintaining means and said first transferring means for determining from said one of said 2^M addresses corresponding to the one of said 2^M cells currently directly adjacent to said memory storage element access point and from said one of said 2^M addresses corresponding to said one of said 2^N cells within said desired one of said 2^{M-N} blocks to be accessed by said CPU, an address corresponding to a one of the 2^N cells within said desired one of said 2^{M-N} blocks to next become adjacent to said memory storage element access point, and having a second transferring means responsively coupled to said determining means and said CPU for transferring said address determined by said determining means to said CPU to permit it to access said desired one of 2^{M-N} blocks from said determined address, said determining means comprising:

first disassembly means responsively coupled to said first transferring means for disassembling said requested address transferred from said CPU into a requested block number identifying one of said 2^{M-N} blocks to be accessed and a requested word number identifying one of said 2^N storage cells within said requested block number;

second disassembly means responsively coupled to said maintaining means for disassembling said address of said storage cell directly adjacent to said memory storage element access point into a memory block number identifying one of said 2^{M-N} blocks and a memory word number identifying one of said 2^N storage cells within said memory block number;

a comparator responsively coupled to said first disassembly means and said second disassembly means which compares said requested block number with said memory block number;

means responsively coupled to said comparator and said second disasssembly means for selectively adding 1 to said memory word number if and only if said comparator indicates said requested block number is less than or equal to said memory block number; and

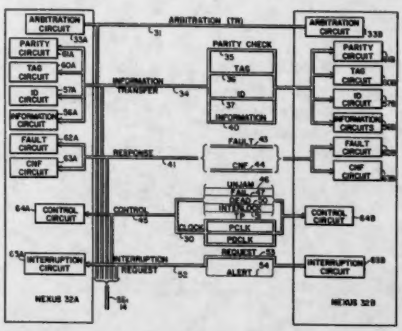
means responsively coupled to said first disassembly means, said selective adding means, and said second transferring means for combining said requested block number with said memory word number as potentially modified by said selective adding means to produce said determined address to be transferred to said CPU.

4,232,366

BUS FOR A DATA PROCESSING SYSTEM WITH OVERLAPPED SEQUENCES

John V. Levy, Palo Alto, Calif.; David P. Rodgers, Acton, Mass.; Robert E. Stewart, and Richard J. Casabona, both of Stow, Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Continuation-in-part of Ser. No. 845,415, Oct. 25, 1977, abandoned. This application Oct. 25, 1978, Ser. No. 954,601
Int. Cl.³ G06F *9/46*
U.S. Cl. 364—200 **43 Claims**



1. A data processing system comprising

A. timing means for generating timing signals, that define successive transaction intervals,

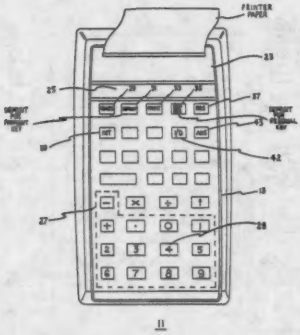
B. system interconnection means including:
i. bus access control signal interconnection means for transferring bus access control signals,
ii. information signal interconnection means for transferring information signals, and
iii. confirmation signal interconnection means for transferring confirmation signals,
C. a plurality of nexus means each including:
i. bus access control means connected to said bus access control signal interconnection means and to said timing means for transferring bus access control signals and for controlling the access of its respective nexus means to said system interconnection means in response to bus access control signals,
ii. information transfer means connected to said information signal interconnection means, said bus access control means, and said timing means for transferring information signals, and
iii. confirmation transfer means connected to said confirmation signal interconnection means, said information transfer means, and said timing means for indicating the status of an information transfer a predetermined interval after the information transfer by transferring confirmation signals,
said information transfer means and said confirmation transfer means being responsive to the timing signals from said timing means to establish transaction sequences each comprising a plurality of successive transaction intervals, each transaction sequence including an information transfer interval and a subsequent confirmation interval, said information transfer means transferring information during the information transfer interval of a particular transaction sequence and said confirmation transfer means transferring corresponding confirmation signals during the confirmation interval of that particular transaction sequence, said system interconnection means being able to transfer information signals and confirmation signals corresponding to different transaction sequence during a particular transaction interval whereby plural transaction sequences are overlapped.

4,232,367

APPARATUS FOR MAXIMIZING INTEREST EARNINGS AND PROVIDING PAYMENTS FROM PRINCIPAL WITHOUT INTEREST PENALTY

Robert H. Youden, 715 DeSoto Dr., Palo Alto, Calif. 94303, and Charles S. Robertson, 1116 E. Rose Cir., Los Altos, Calif. 94022

Filed Jun. 12, 1978, Ser. No. 914,497
Int. Cl.³ G06F *15/30*
U.S. Cl. 364—408 **6 Claims**



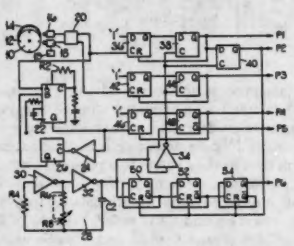
1. Calculator apparatus for determining minimum principal amounts depositable into passbook and term accounts having pre-determined interest rates and minimum deposit requirements to provide maximum interest earnings and payments from principal without interest penalty, the apparatus comprising:
keyboard means having a plurality of keys for entering data including keys for entering a selected number of years and a key for initiating minimum principal calculations;
first memory means coupled to the keyboard means for storing entered data;
logic means coupled to the first memory means and including a second memory means having a program, the predetermined interest rates and the minimum deposit requirements stored therein for calculating, under control of the stored program and in response to actuation of the key for initiating minimum principal calculations, minimum principal amounts in accordance with the predetermined interest rates, the minimum deposit requirements and the number of years and payment amount selected, the minimum principal amounts being depositable into the passbook and term accounts to provide maximum interest earnings and payments from principal without interest penalty; and
printer means coupled to the logic means for printing the calculated minimum principal amounts.

4,232,368

INTERNAL COMBUSTION ENGINE FUNCTION CONTROL SYSTEM

William F. Hill, Stafford, and John P. Southgate, Georgeham, Nr. Braunton, both of England, assignors to Lucas Industries Limited, Birmingham, England

Filed Sep. 8, 1978, Ser. No. 940,697
Claims priority, application United Kingdom, Sep. 16, 1977, 38694/77
Int. Cl.² G06F *15/20*; F02P *5/04*
U.S. Cl. 364—431 **10 Claims**



1. An internal combustion engine function control system comprising first and second signal generating means mechanically driven by the engine, said first signal generating means producing a train of signals at a first frequency equal to the required function frequency, and the second signal generating means producing a train of signals at a second frequency which is a multiple of the first frequency, engine parameter sensitive means for varying the phase of the first signal train relative to that of the second signal train between limits such that the combined ordinal succession of the signals is maintained constant, and function timing means for causing triggering of an output circuit at the end of a delay following the generation of a signal from said first signal generating means, such delay consisting of the sum of a first delay equal to the period between the generation of said signal from said first signal generating means and the generation of a selected one of said train of signals produced by said second signal generating means and a second delay, the first and second delays being determined by the frequency and phase relationship of the two signal trains.

4,232,369

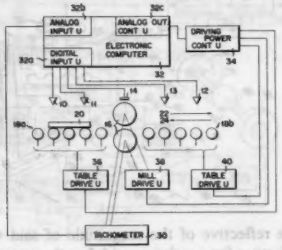
METHOD OF CONTROLLING THE DECELERATION OF A REVERSING MILL

Shigeki Fukushima, Fuchu, and Tadahiro Ohashi, Kokubunji, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jul. 31, 1978, Ser. No. 929,563

Int. Cl.³ G06F *15/46*; G05B *15/00*; B21B *37/00*

U.S. Cl. 364—476 **11 Claims**



1. A system for controlling the deceleration of a reversing mill, comprising:

reversible main mill rolls for rolling a piece;

a pair of roller tables provided on both sides of said main mill rolls and along the path of said main mill rolls for moving said piece;

drive means for driving said main mill rolls and said roller tables;

a plurality of piece position sensors arranged on both sides of said main mill rolls and along said roller tables for detecting the position of said piece and for generating a detection signal;

load cell means for generating a signal when said piece is bitten by said main mill rolls and when said piece is released from said main mill rolls; and

control means for controlling said drive means;

wherein said control means actuates said drive means so as to accelerate said piece up to a predetermined bite speed, to start accelerating said piece up to a predetermined rolling speed in response to a detection signal of said load cell means representing that said piece is bitten by said main mill rolls, and to start deceleration said piece down to a predetermined kickout speed at a predetermined rate when said piece reaches a predetermined deceleration starting point from a position where it has been detected by a selected one of said piece position sensors which are arranged on the piece feed side of said main mill rolls, said selected hot piece detector being located nearer to said deceleration starting point than the other detectors and farther from said main mill rolls than said deceleration starting point, said deceleration starting point being determined such that said piece is decelerated down to the predetermined kickout speed the moment it is released from said main mill rolls, said deceleration starting point being located at a point where said piece exists upon the lapse of a period of time derived from said rolling speed and the distance between said selected piece position sensor and said deceleration starting point and set in a timer which starts in response to the detection signal from said selected piece position sensor, whereby the moment said piece is released from said main mill rolls, deceleration at a predetermined rate is started on said piece in response to an output signal of said load cell means thereby to stop said piece after it has traveled a predetermined kickout distance.

6. A method for controlling the deceleration of a reversing mill having reversible main mill rolls for rolling a piece, a pair of roller tables provided on both sides of said main mill rolls and along the path of said main mill rolls for moving said piece, drive means for driving said main mill rolls and said roller tables, a plurality of piece position sensors arranged on both sides of said main mill rolls and along said roller tables for detecting the position of said piece and for generating a detection signal, load cell means for generating a signal when said piece is bitten by said main mill rolls and when said piece is released from said main mill rolls, and control means for controlling said drive means, wherein said method comprises the steps of:

accelerating said piece on said roller tables up to a predetermined bite speed and causing said piece to travel at said bite speed;

accelerating said piece up to a predetermined rolling speed, starting when said piece is bitten by said main mill rolls, and causing said piece to travel at said predetermined rolling speed;

decelerating said piece at a predetermined deceleration rate, starting when said piece reaches a deceleration-starting point so that said piece is released from said main mill rolls at a predetermined kickout speed; and

decelerating said piece released from said main mill rolls at another rate so as to stop said piece after said piece has traveled a predetermined kickout distance.

4,232,370

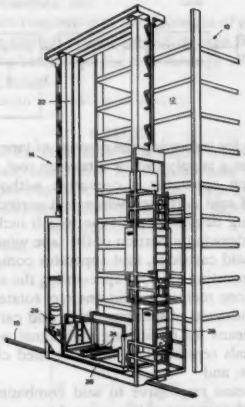
CONTROL SYSTEM FOR A STORAGE/RETRIEVAL MACHINE IN AN AUTOMATED MATERIAL HANDLING SYSTEM

David R. Tapley, Battle Creek, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Continuation-in-part of Ser. No. 854,178, Nov. 23, 1977, abandoned. This application Dec. 7, 1978, Ser. No. 967,321

Int. Cl.³ G06F *15/40*

U.S. Cl. 364—478 **5 Claims**



1. A control system for controlling the operation of a storage/retrieval (S/R) machine in a material handling system, the S/R machine being directed by the control system to perform an ordered sequence of movements between addressable stations in response to a control command for the stacking and/or retrieving of material units, the control system comprising:

input means for operator communication of a control command specifying an S/R machine operation:

programmable processing means operatively coupled with the input means and responsive to an operator control command for directing the S/R machine to perform an ordered sequence of movements corresponding to the specific control command, the programmable processing means being controlled by a stored program and including,

memory means for storing program instructions, and

central processing means operatively coupled with the memory means and responsive to the stored program for executing the instructions to cause the S/R machine to perform the specified S/R machine operation,

the memory means comprising a first memory block having a host control program of instructions encoded in an, elementary program language, and a second memory block having a user application program of instructions encoded in a non-elementary program, the central processing means including first means operatively coupled with the first memory block and the second memory block and being responsive to a selected instruction in the first memory block for accessing selected instructions in the second memory block,

the first memory block including second means operatively coupled with the first means for emulating the selected instructions from the second memory block,

the central processing means including third means operatively coupled with the second means for producing control signals for the S/R machine in accordance with the selected instructions from the second memory block,

said first memory block being physically separate from the second memory block and being a read only memory.

4,232,371

APPARATUS FOR INDICATING THE AMOUNT OF TAPE WOUND UPON A REEL

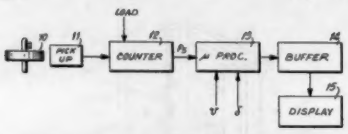
Hidetoshi Kamoto, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 24, 1978, Ser. No. 963,319

Claims priority, application Japan, Dec. 29, 1977, 52-158870

Int. Cl.³ G06F *15/20*

U.S. Cl. 364—561 **12 Claims**



1. Apparatus for indicating the amount of tape wound upon one reel, such as a supply reel or a take-up reel, in a two-reel cartridge, which apparatus is operative without regard to previous use of said cartridge when said cartridge is loaded into a processing device of the type which includes loading means for withdrawing a portion of the tape wound upon said one reel from said cartridge, said apparatus comprising:

means for generating a signal representing the angular velocity of said one reel when said one reel rotates in response to the withdrawal of said tape from said cartridge;

combining means for combining said signal with predetermined signals representing predetermined characteristics of said tape; and

indicating means responsive to said combining means for indicating the amount of tape wound upon said one reel as a function of said generated signal.

4,232,372

POSITIVE AND NEGATIVE ACCELERATION RESPONSIVE MEANS AND SYSTEM

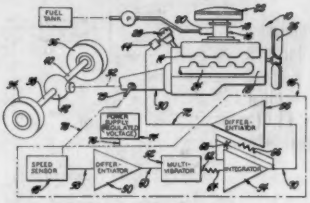
John G. Berent, Madison Heights, Mich., assignor to Colt Industries Operating Corp, New York, N.Y.

Division of Ser. No. 689,159, May 24, 1976, abandoned. This application Oct. 2, 1978, Ser. No. 947,395

Int. Cl.³ G01P *15/00*

U.S. Cl. 364—566 **14 Claims**

1. Acceleration responsive system means, comprising first means responsive to the velocity of monitored structure means, said first means being effective for producing a first electrical output signal corresponding to the magnitude of said velocity, second means adapted to receive said first electrical output signal and in response thereto create a second electrical output triggering signal, third means adapted to receive said second electrical output triggering signal and effective to employ said second electrical output triggering signal in order to thereby create a third pulse-type electrical output in timed relationship to said second electrical output triggering signal, fourth means adapted to receive and integrate said pulse-type electrical output in order to thereby create a fourth output voltage of a



magnitude reflective of the magnitude of said velocity, fifth means effective for receiving said fourth output voltage and sensing the rate of change of the magnitude of said fourth output voltage in order to thereby produce an output control signal of a magnitude related to said rate of change of said magnitude of said fourth output voltage, and electrical load means for receiving said electrical output control signal for responding thereto.

4,232,373

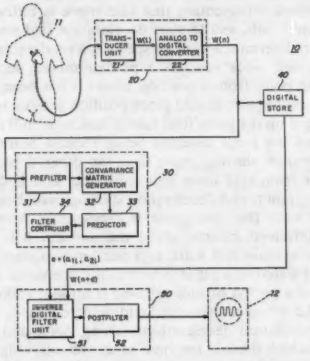
COMPENSATION OF FLUIDIC TRANSDUCERS

Leland B. Jackson, and Dov Jaron, both of Kingston, R.I., assignors to Regents for Education of the State of Rhode Island, Providence, R.I.

Filed Apr. 14, 1978, Ser. No. 896,357

Int. Cl.² G06F *7/38*

U.S. Cl. 364—572 **8 Claims**



1. The method of compensating digitized pressure waveform output indicators of a fluid-filled catheter transducer which comprises the steps of:

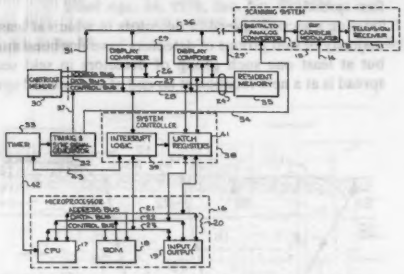
(a) generating from the digitized pressure waveform output indications pole signals that are associated with the fluid-filled catheter; and,

(b) inverse filtering the digitized pressure waveform output indications under the control of said pole signals to cancel said pole signals.

4,232,374
SEGMENT ORDERING FOR TELEVISION RECEIVER CONTROL UNIT

David H. Chung, Palo Alto, and John V. Cosley, Cupertino, both of Calif., assignors to Umtech, Inc., Sunnyvale, Calif.

Filed Aug. 11, 1977, Ser. No. 823,619
Int. Cl.[3] G06F 3/153; A63F 9/22
U.S. Cl. 364—900 12 Claims



1. A method of arranging information defining a display for a display surface area which is scanned by a scanning system to produce said display, comprising the steps of:

A. storing at predetermined locations in memory apparatus, sets of information respectively defining a plurality of spatial display segments, each of which at least partially defines an object image that it may be desired be included in said display;

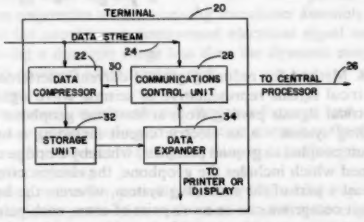
B. placing in memory apparatus in a predetermined order correlated with the order of appearance in said display of those spatial display segments to be included therein, indicia uniquely associated with each of the sets of information defining those spatial display segments to appear in said display, which said indicia at least partly defines the geometrical location on said display surface area at which the spatial display segment to which it is associated is to appear; and

C. responding to said predetermined order of indicia by extracting from said memory apparatus in their order of appearance in said display, those sets of information defining the spatial segments to be included in said display.

4,232,375
DATA COMPRESSION SYSTEM AND APPARATUS

John F. Paugstat, Salesville, and Donald J. Girard, Cambridge, both of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Jun. 12, 1978, Ser. No. 914,821
Int. Cl.[3] G06F 7/20, 7/34; H03K 13/00
U.S. Cl. 364—900 12 Claims



1. In a system for transmitting a plurality of data messages each comprising redundant and non-redundant characters between a data terminal device and a central processor in which a character is considered redundant if the character is the same in succeeding data messages, a data compression apparatus for generating a compressed data record representing the data messages generated as part of a merchandising operation by the data terminal device comprising in combination:

first storage means for storing the characters of the data messages generated by the data terminal devices;

means for generating a plurality of first control signals in response to the disabling of said central processing means and the storing of the data message in said first storage means;

timing control means operated in response to the generation of each of said first control signals to output a plurality of timing control signals;

second storage means for storing data representing a compressed data record;

table look-up means coupled to said first and second storage means and said timing control means for storing a plurality of first non-redundant characters together with an associated one of a plurality of start of compressed data record characters; said table look-up means operated in response to the generation of another of said timing control signals to receive a first non-redundant character from said first storage means for storing in said second storage means one of said plurality of start of compressed data record characters in accordance with the first non-redundant character received from said first storage means, said start of compressed data record character also contains information representing the first non-redundant character;

third storage means coupled to said first storage means for storing a character of the first data message in response to the generation of one of said timing control signals;

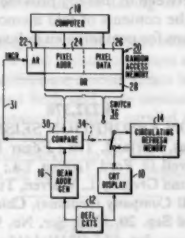
means coupled to said first and third storage means for comparing the corresponding character of each succeeding data message with the character stored in said third storage means to determine if the character is redundant or non-redundant; and

control means responsive to the operation of said comparing means for storing in said second storage means the non-redundant character of the data message when a comparison is not found.

4,232,376
RASTER DISPLAY REFRESH SYSTEM

Donald F. Dion, and David R. Wojcik, both of Burlington, Mass., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 15, 1979, Ser. No. 20,937
Int. Cl.[2] G11C 13/00
U.S. Cl. 365—222 6 Claims



1. A raster display refresh system, comprising

a cathode ray tube display unit having beam deflection means,

a beam address generator synchronized with said beam deflection means,

a circulating refresh memory operative in synchronism with said beam deflection means to repeatedly supply a frame of picture element data signals to said cathode ray tube,

a small random access memory having storage locations

each for storing, in order of raster scan sequence, a picture element address and associated picture element data,

an address counter to sequentially access said storage locations, and

a comparator means operative when the picture element address from an accessed storage location matches the beam address from the beam address generator to transfer the accessed picture element data from the random access memory to the circulating refresh memory and to increment said address counter.

4,232,377

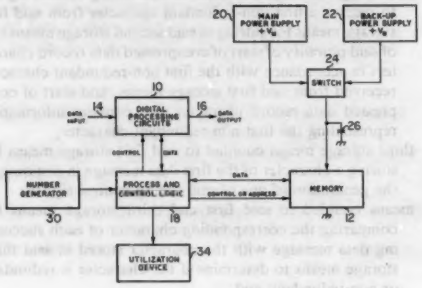
MEMORY PRESERVATION AND VERIFICATION SYSTEM

James L. Tallman, Hillsboro, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Apr. 16, 1979, Ser. No. 30,509

Int. Cl.[2] G11C *13/00*

U.S. Cl. 365—229 **2 Claims**



1. A memory preservation and verification system comprising:

power supply means coupled to said memory for energization thereof, said power supply means including a main power supply and a backup power supply;

means for generating a first digital number;

process and control logic means for generating a second digital number and storing both of said first and second digital numbers in said memory, said second digital number being mathematically related to said first digital number;

said process and control logic means also for retrieving said first and second digital numbers and checking the relationship therebetween to thereby provide a verification of the validity of the contents of said memory; and

utilization means for providing an indication of said verification.

4,232,378

FORMATION ABSORPTION SEISMIC METHOD

Halbert E. Adams, Garland, Tex.; Edgar R. Cooper, New Orleans, La.; Lowell D. Ford, Gretna, La.; Delbert C. Johnson, Marrero, La., and Gregory L. Warren, Tulsa, Okla., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Sep. 20, 1978, Ser. No. 944,091

Int. Cl.[3] G01V *1/16*

U.S. Cl. 367—36 **7 Claims**

1. A seismic prospecting method for finding zones of anomalous absorption of seismic waves between pairs of refractive layers in subsurface formations, comprising:

a. locating a number of seismic wave detectors in a plurality of groups in a first spread at least near the surface of the earth;

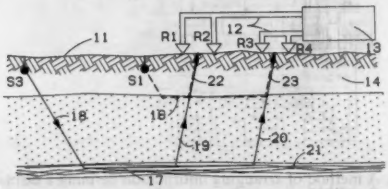
b. initiating seismic waves at a first source location near the surface of the earth a distance L_1 from one end of said spread, and making a reproducible record of at least the amplitude of initially received refracted seismic waves at said plurality of groups of detectors from this initiation;

c. repeating step b for seismic waves initiated at a distance L_2 from said one end of said spread, L_2 being at least substantially greater than L_1;

d. repeating step b for seismic waves initiated substantially at a distance L_1 from the opposite end of said first spread;

e. repeating step b for seismic waves initiated at least substantially at a distance L_2 from said opposite end of said first spread;

f. locating a second spread of detectors in which at least the majority of said groups of detectors have not been moved, but at least one such group of detectors in said second spread is at a new location at an end of said second spread;



g. repeating step b, c, d and e for the detector groups forming said second spread, whereby the relative amplitudes of said initially received seismic waves corrected for size of shot, range and group may be determined for refracted waves received at each group for seismic wave initiations at the various locations L_2, and

h. plotting on a cross-section map on up-coming lines representing at least approximately the up-coming paths of refracted waves to the various detector group locations, the corresponding value of said relative corrected amplitudes of said initially received seismic waves at said various detector groups, so that zones on anomalous absorption of refracted waves may be ascertained.

4,232,379

AUTOMATIC BALANCING SYSTEM FOR SEISMIC EQUIPMENT

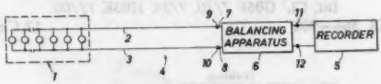
Lukas Ensing, Rijswijk, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 22, 1978, Ser. No. 963,052

Claims priority, application United Kingdom, Dec. 29, 1977, 54145/77

Int. Cl.[2] G01V *1/22*

U.S. Cl. 367—43 **29 Claims**



18. Method for reducing ground current interference with electrical signals representative of seismic wave signals, said electrical signals passing from at least one geophone to a recording system via an electric circuit including a balancing circuit coupled to ground potential, whereby a bridge circuit is formed which includes the geophone, the electric circuit, and at least a part of the recording system, wherein the balancing circuit comprises one or more pairs of arms, each pair having at least one arm with a variable impedance, said method comprising:

automatically adjusting said variable impedances of said pairs of arms in a predetermined sense;

detecting variations in the unbalance of said bridge circuit; and

automatically readjusting the variable impedances in a sense

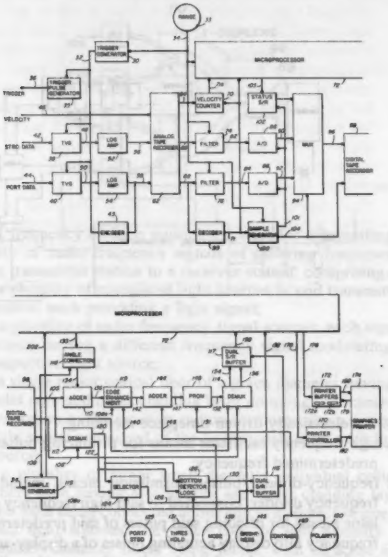
opposite to said predetermined sense if the unbalance has increased as a result of said adjusting.

4,232,380

UNDERWATER MAPPING APPARATUS AND METHOD

Roger L. Caron, Westford, Mass.; Peter J. Clifford, Barrington, R.I., and Francis R. Germain, Winchester, Mass., assignors to EG & G, Inc., Wellesley, Mass.

Filed Apr. 14, 1978, Ser. No. 896,474
Int. Cl.³ G01S *15/89*
U.S. Cl. 367—88 **19 Claims**



1. In an apparatus for producing a plan view display of a seabed from a side scan sonar signal system in which the sonar generating and receiving means move with respect to the seabed, said apparatus comprising

at least one transmitting transducer assembly for repeatedly generating side scan sonar signals in response to a trigger signal, said trigger signals each defining the beginning of a measurement cycle,

at least one receiving transducer assembly for providing a received electrical signal output, said output having an amplitude corresponding to the intensity of received returning sonar signals,

means responsive to the receiving transducer assembly output for providing a compressed electrical signal output having a dynamic range less than the dynamic range of said received sonar signals, and

a display device,

the improvement wherein said display is linear at least along an axis corresponding to a direction normal to the direction of movement of said generating and receiving means, and comprising

sampling means for periodically sampling said compressed electrical signal within each measurement cycle to generate a sequence of sampled signal values,

height determining means for repeatedly determining the height of said sonar generating and receiving means above the seabed,

means responsive to said height determination and said sampled signals for generating a sequence of linear data values corresponding to a mapping of said sampled signals onto a sequence of equi-distant locations along a horizontal seabed-representing axis,

said display device having means for receiving and displaying said linear data, and

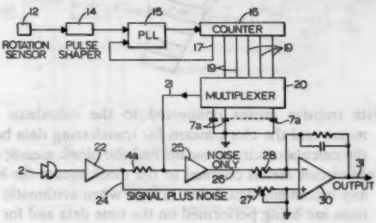
a display control means for actuating said display device to produce said plan view map of said seabed.

4,232,381

NOISE CANCELLATION USING TRACKING FILTER

Lyle V. Rennick, Mission Viejo, and Julian W. Macias, Irvine, both of Calif., assignors to Northrop Corporation, Hawthorne, Calif.

Filed Jun. 8, 1979, Ser. No. 47,377
Int. Cl.³ H04B *1/06*
U.S. Cl. 367—135 **19 Claims**



1. In an acoustic signal-handling system carried by a vehicle having a noise-producing engine capable of operation at various engine speeds, means for eliminating engine-related noise from the total acoustic signal received by said acoustic signal system, comprising:

a. engine rotation sensing means;

b. commutating filter means having an effective pole contact and a plurality of position contacts swept through by said pole contact during each complete cycle of its operation, a plurality of capacitor means connected at one end of each to respective ones of said position contacts and at the other end to a stable potential source;

c. means responsive to said engine rotation sensing means for effectively driving said pole contact sequentially through said position contacts at a rate of one cycle of said pole contact of each revolution of said engine;

d. microphone means exposed to the acoustic environment of said system for receiving desired signals;

e. difference circuit means having an output proportional to the difference between two separate inputs;

f. filter input resistance means having an input end and an output end;

g. means connecting the output of said microphone means to said input end of said resistance means and to one of said inputs of said difference circuit means in parallel; and

h. means connected both said pole contact and said output end of said resistance means in parallel to the second said input of said difference circuit means, whereby said engine-related noise picked up by said microphone means is cancelled from the output of said difference circuit means.

4,232,382

INCREMENTING SIGNAL HOLD CIRCUIT FOR A CLOCK/CALCULATOR

Edward A. Heinsen, Corvallis, Oreg., and Vijay V. Marathe, Sunnyvale, Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed May 26, 1977, Ser. No. 800,761
Int. Cl.³ G04C *3/00*; G04G *5/02*; G06F *7/38*
U.S. Cl. 368—1 **10 Claims**

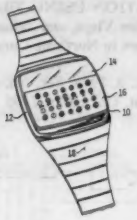
1. A clock calculator comprising:

an input device;

a display;

a clock means coupled to the display for storing time data, the clock means including incrementing circuit means for producing an increment signal to periodically update the time data;

calculator circuit means coupled to the input device, the display and the clock means for performing arithmetic operations on time data from the clock means;



data transfer means connected to the calculator circuit means and the clock means for transferring data between the calculator circuit means and the clock means; and

hold circuit means coupled to the clock means for holding any increment signal that occurs when arithmetic operations are being performed on the time data and for updating the time data in accordance with any held increment signal when the time data is transferred back to the clock means from the calculator circuit means.

4,232,383

ELECTRONIC TIMEPIECE BATTERY MONITORING CIRCUIT

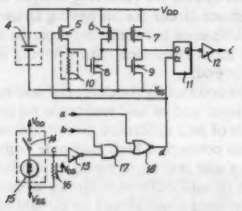
Hiroyuki Chihara, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Apr. 26, 1978, Ser. No. 899,926

Claims priority, application Japan, Apr. 26, 1977, 52-48292

Int. Cl.³ G04C *23/00*; G04B *1/00*; G08B *21/00*

U.S. Cl. 368—66 **11 Claims**



1. In an electronic timepiece including a battery for producing a supply voltage and a battery detection circuit for detecting when the supply voltage of said battery falls below a predetermined level and in response thereto produces a detection signal, the improvement comprising monitoring means for producing an indication signal in response to said detection signal being applied thereto, a load means adapted to be selectively coupled to said battery and in response thereto place an additional load thereon, and inhibit means coupled to said battery detection circuit and said monitoring means, said inhibit means being further coupled to said load means for inhibiting said detection signal from being applied to said monitoring means when said load means is coupled to said battery.

4,232,384

TIMESETTING ARRANGEMENT FOR ELECTRICAL TIMEPIECES

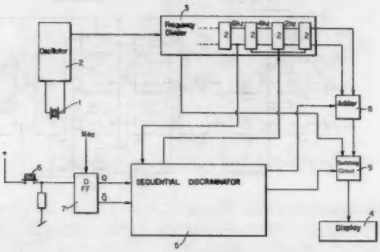
Jean-Pierre Jaunin, Nidau, Switzerland, assignor to Societe Suisse pour l'Industrie Horlogere Management Services S.A., Bienne, Switzerland

Continuation of Ser. No. 766,659, Feb. 8, 1977, abandoned. This application Dec. 13, 1978, Ser. No. 969,046

Claims priority, application United Kingdom, Feb. 23, 1976, 7023/76

Int. Cl.³ G04B *17/12*; G04C *9/00*

U.S. Cl. 368—185 **8 Claims**



1. An electrically driven timepiece including:

a high frequency oscillator means for producing pulses of a predetermined frequency;

a frequency-divider/pulse-transmission means, including a frequency divider, connected to said high frequency oscillator means for dividing said pulses of said predetermined frequency into display actuating pulses of a display-actuating frequency and transmitting the pulses to a time display means;

a time display means including at least minute and second displays connected to said frequency-divider/pulse-transmission means for receiving said display-actuating pulses and for advancing said minute and second displays in response thereto, said time display means including a stepping motor arranged to drive time displaying hands;

a single user-accessible switch for correcting and setting the display, said switch being capable of assuming at least two positions including a neutral and an active position;

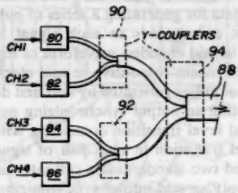
a sequential-discriminator/memory circuit means connected between said switch and said frequency-divider/pulse-transmission means for generating combinations of controls in response to time cycle patterns with which the single switch is moved between the neutral and active positions, a first such control being the insertion of a pulse into the frequency divider transmission means for each movement of said switch from said neutral position to said active position, a second such control blocking transmission of pulses by the frequency-divider/pulse-transmission means to prevent advancement of the displays in response to the switch being held in the active position for a predetermined length of time, and a third such control operating on the frequency-divider/pulse-transmission means to increase the rate at which pulses are transmitted to the time display to thereby advance the displays at a faster than normal rate in response to the switch being held in the active position for a predetermined length of time, and thereafter being moved to the neutral positon and quickly returned to the active position.

4,232,385

FREQUENCY DIVISION MULTIPLEXING SYSTEM FOR OPTICAL TRANSMISSION OF BROADBAND SIGNALS

Elmer H. Hara, Ottawa, Canada, and Takeshi Ozeki, Tokyo, Japan, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Ottawa, Canada

Filed Jul. 7, 1978, Ser. No. 922,715
Claims priority, application Canada, Jul. 12, 1977, 282545
Int. Cl.³ H04B *9/00*
U.S. Cl. 370—3 **9 Claims**



1. A frequency division multiplex system for transmitting a plurality of radio frequency signals of differing frequencies from a transmitter station to a receiver station, comprising:

(a) a plurality of modulated light sources in said transmitter station, each providing a light signal;

(b) a plurality of radio frequency signal sources, each signal source having a different frequency signal modulating a respective light source;

(c) a single major optical fiber of a given diameter having a solid core and outer cladding layer coupling the transmitter station to the receiver station for transmitting a mixed light signal comprised of the light signals from each light source;

(d) a plurality of minor small diameter individual optical fibers each having a solid core and outer cladding layer and each being connected at one end to a respective one of said light sources, the other ends of said plurality of smaller diameter fibers being joined with adjacent like fiber ends in a plurality of input pairs providing a plurality of optical fiber Y-couplers, each Y-coupler having two optical fiber inputs butt jointed to one optical fiber output of a larger diameter than said inputs, each said light source being connected as one input of a first respective Y-coupler via one minor optical fiber, the larger diameter output optical fiber of each Y-coupler being connected as an input optical fiber of a subsequent Y-coupler having an output optical fiber of successively larger diameter than the associated pair of input fibers until only two outputs remain, said two outputs being connected to said major optical fiber having the largest diameter by a last Y-coupler; and

(e) detector means located in said receiver station and operatively associated with said major optical fiber for detecting said plurality of different radio frequency signals from said mixed light signal.

4,232,386

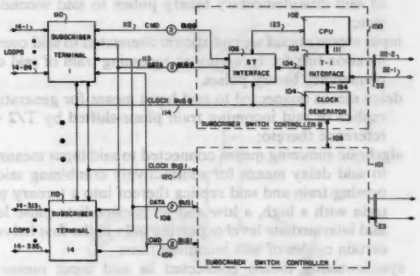
SUBSCRIBER SWITCH CONTROLLER FOR CONTROLLING CONNECTIONS BETWEEN A PLURALITY OF TELEPHONE SUBSCRIBER LINES AND A PAIR OF MULTITIME-SLOT DIGITAL DATA BUSES

John C. McDonald; James R. Baichtal, both of Los Altos, and Alexander C. Ling, Mountain View, all of Calif., assignors to TRW Inc., Los Angeles, Calif.

Filed Feb. 6, 1978, Ser. No. 875,498
Int. Cl.² H04Q *11/04*
U.S. Cl. 370—68 **12 Claims**

8. In a telephone system operating in time frames each consisting of a plurality of time slots having a first time slot rate, said system including a base switch connected to a plurality of multitime-slot buses for switching data between any of the time slots and including a subscriber switch connected to a plurality of local subscriber lines and to a pair of said plurality of buses for switching encoded data between said subscriber lines and time slots on said pair of buses specified by said base switch, said subscriber switch including a pair of subscriber switch controllers for enabling the switching of encoded data between said plurality of subscriber lines and said pair of buses, an arrangement wherein each of said controllers comprises:

interface means responsive to control signals for switching first encoded data from said subscriber lines in specified



time slots in one of said pair of buses and for switching second encoded data from one of said pair of buses to specified ones of said subscriber lines,

processor means responsive to said time slots specified by said base switch for generating said control signals,

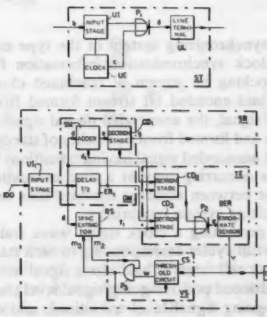
said interface means including attenuation memory means for storing predetermined encoded data representing predetermined attenuation states and means connected to said receive data bus for addressing said attenuation memory means at locations corresponding to an attenuated value for switching said attenuated data to said subscriber lines.

4,232,387

DATA-TRANSMISSION SYSTEM USING BINARY SPLIT-PHASE CODE

Ezio Cottatellucci, Milan, Italy, assignor to Societa Italiana Telecomunicazioni Siemens S.p.A., Milan, Italy

Filed Dec. 18, 1978, Ser. No. 970,147
Claims priority, application Italy, Dec. 21, 1977, 31006 A/77
Int. Cl.³ G08C *25/00*; H04L *7/02*
U.S. Cl. 371—47 **6 Claims**



1. A system for the transmission of binary signals, comprising:

a first station and a second station interconnected by a communication link;

clock means at said first station establishing a sequence of pulse cycles of predetermined duration T;

a data source generating two-level message pulses synchronized with said clock means to coincide with said pulse cycles;

transcoding means at said first station connected to said source and to said clock means for converting each message pulse into a pair of mutually complementary binary pulses occurring in respective half-cycles of the corresponding pulse cycle, the order of occurrence of said complementary pulses depending upon the respective message-pulse level, said transcoding means being connected to said communication link for transmitting a train of said complementary binary pulses to said second station;

input means at said second station connected to said communication link for receiving an incoming train of said complementary binary pulses;

delay means connected to said input means for generating a replica of said incoming train phase-shifted by T/2 with reference thereto;

algebraic summing means connected to said input means and to said delay means for subtractively combining said incoming train and said replica thereof into a ternary pulse train with a high, a low and an intermediate pulse level, said intermediate level occurring only in the first halves of certain cycles of said incoming train;

synchronizing means connected to said input means for establishing a series of timing pulses normally occurring during the second halves of respective cycles of said incoming train; and

decision means connected to said summing means and to said synchronizing means for sampling said ternary pulse train at the instant of occurrence of each timing pulse to generate a binary pulse sequence corresponding to said message pulses.

4,232,388

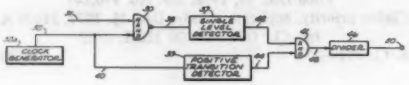
METHOD AND MEANS FOR ENCODING AND DECODING DIGITAL DATA

Jordan Isailovic, Torrance, Calif., assignor to MCA DiscoVision, Inc., Universal City, Calif.

Division of Ser. No. 848,550, Nov. 4, 1977. This application Jul. 21, 1978, Ser. No. 927,263

Int. Cl.³ H04L 7/02

U.S. Cl. 375—110 **1 Claim**



1. A data synchronizing system of the type employed for recovering clock synchronization information from an encoded self-clocking bit stream of combined clock and data information, said encoded bit stream formed from an unencoded digital signal, the unencoded digital signal having two voltage levels and formed from a plurality of standard data cell intervals, said unencoded signal having transitions between the voltage levels occurring only at a time coinciding with the transition time between adjacent standard data cell intervals, said synchronizing system comprising:

means for generating a clock signal wave train having at least two full cycles corresponding to each standard unencoded data cell interval, said clock signal having sequentially positioned positive-going signal level transitions and negative-going signal level transitions, said clock signal having a positive-going signal level transitions coinciding with transition time between adjacent standard unencoded data cell intervals;

means for receiving an encoded waveform of combined clock and data information, said encoded bit stream having two voltage levels with negative-going and positive-going voltage level transitions occurring in the encoded waveform representing said clock information and data information, the intervals between transitions being variable in length and occurring at increments of a single standard data cell interval and one and a half standard data cell intervals and two standard data cell intervals, said increment of two standard data cells in length starting and ending with signal level transitions occurring at a time coinciding with the time between successive data cell intervals in said unencoded waveform;

first detection means responsive to said encoded waveform of digital data for generating a series of pulses, and one of said pulses corresponds to each signal level transition contained in said encoded waveform of digital data;

zero detection means responsive to said clock signal and to said series of pulses generated by said first detection means for generating an output synchronizing pulse signal having a signal level transition coinciding with each second signal level transition in each pair of signal level transitions spaced two standard data cell intervals apart; and

means for applying said output synchronizing signal to said clock generating means for maintaining said positive-going signal level transition of said clock signal in synchronism with the transition time between standard data cell intervals.

4,232,389

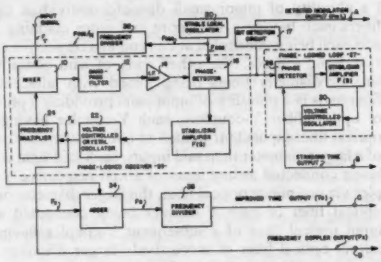
RECEIVER FOR SATELLITE NAVIGATIONAL POSITIONING SYSTEM

Roger D. Loller, Newbury Park, Calif., assignor to JMR Instruments, Inc., Chatsworth, Calif.

Filed Apr. 9, 1979, Ser. No. 28,266

Int. Cl.³ H04B 7/00

U.S. Cl. 455—12 **8 Claims**



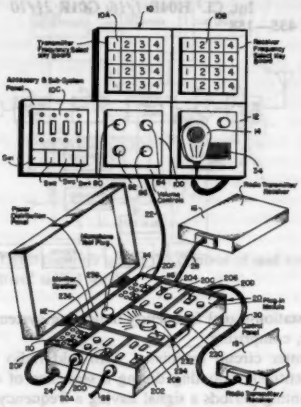
1. A receiver for use in a satellite system, said system comprising a plurality of satellites each of which includes means for producing a radio frequency carrier and a clock having a frequency related to the frequency of the carrier, said carrier being phase-modulated with digital data, and said clock being adjustable in response to injection signals from a ground station to provide a precise repeatable time interval during which the digital data is transmitted, said receiver including: a receiver system phase-locked with the radio frequency carrier from the satellite and including a heterodyne mixer for receiving the radio frequency carrier, means connected to said heterodyne mixer and including a phase detector for recovering the digital data from the carrier, a stable local oscillator for supplying a reference signal to said phase detector, first circuit means including a voltage controlled oscillator connected to the phase detector and responsive to a phase error signal from the phase detector for supplying a heterodyne signal to the mixer having a predetermined frequency relationship with the carrier, and second circuit means connected to said stable local oscillator and to said first circuit means for producing an output timing signal having a frequency which is a predetermined sub-multiple of the frequency of said carrier.

4,232,390

MOBILE RADIO VEHICLE CONTROL SYSTEM

Richard V. McEvilly, Jr., 236 Tulane Rd., Costa Mesa, Calif. 92626

Filed Sep. 1, 1977, Ser. No. 829,797
Int. Cl.³ H04B 1/40
U.S. Cl. 455—77 8 Claims



1. A mobile radio control system for use in a vehicle having a dash area and a rear area, said system comprising:

a console in said dash area including a first keyboard having a plurality of manually-operated transmitter frequency selection switches and a second keyboard having a plurality of receiver frequency selection manually-operated switches;

transmitter frequency-selecting switching circuitry connected to said switches of said first keyboard;;

receiver frequency-selecting switching circuitry connected to the switches of the second keyboard;

at least one radio transmitter/receiver unit in said rear area;

a combiner unit including circuitry interfacing said radio transmitter/receiver unit with said switching circuitries; and

cable means connecting said transmitter frequency-selecting switching circuitry to said combiner unit to cause the actuation of said switches of said first keyboard to select the transmitter frequency of said radio unit and connecting said receiver frequency-selecting switching circuitry to said combiner unit to cause the actuation of the switches of the second keyboard to select the receiver frequency of the radio transmitter/receiver unit.

4,232,391

VESSEL LOCATION SYSTEM

Hugo A. Zanutti, Clemson 271-B University Gardens, Rio Piedras, P.R. 00927

Filed Jan. 19, 1978, Ser. No. 870,610
Int. Cl.³ H04B 1/034; G08B 1/08
U.S. Cl. 455—96 13 Claims

1. A vessel location system comprising;

a stationary box disposed on the vessel,

an ejectable box received by the stationary box and being seaworthy,

means associated with said boxes for retaining the ejectable box in a retained position relative to the stationary box,

means for biasing the ejectable box away from the stationary box so that when the ejectable box is released it is ejected with force from the vessel,

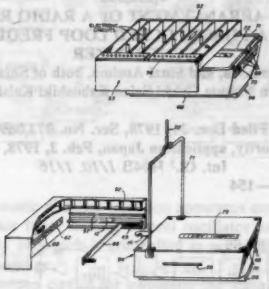
connector means associated with said boxes having interlocked connector parts on each box,

means aboard the vessel that is water-activated during a shipwreck condition for releasing the retaining means to enable the ejectable box to be ejected under force of the biasing means,

means aboard the ejectable box for transmitting a distress signal to permit rescuers to locate the ejectable box,

said means for transmitting including a distress signal transmitter and associated power source both aboard the ejectable box,

input electrical power means including means coupling via the connector means to the power source as long as the connector parts are intercoupled in the retained position,



and switch means responsive to release of the ejectable box for coupling the power source to the transmitter,

said distress signal transmitter including an antenna and means for mounting the antenna from the ejectable box,

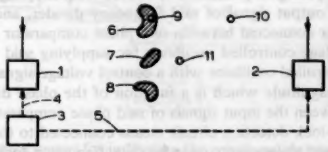
said ejectable box fitting at least partially within an open section of the stationary box, said mounting means for the antenna including an antenna pivot means permitting the antenna to be folded to a position between the two boxes when in a retained position.

4,232,392

RADIO TRANSMISSION SYSTEMS

Richard C. French, Horsham, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 30, 1978, Ser. No. 938,046
Claims priority, application United Kingdom, Sep. 9, 1977, 37729/77
Int. Cl.³ H04B 1/02
U.S. Cl. 455—105 5 Claims



1. A radio transmission system, comprising a base station having a plurality of spaced radio transmitters, in which an information signal is simultaneously transmitted in the same carrier frequency channel from all the radio transmitters, each information signal being transmitted at least twice, said system having transmitter control means operable to reduce the transmission power of at least one, but not all, of the transmitters for the duration of at least one, but not all, of the transmissions of each information signal, in which the transmission power at

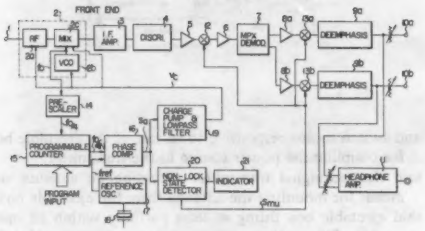
one or more of the remaining transmitters remains the same for all transmissions of each information signal, wherein each transmitter, the transmission power of which can be reduced by the control means, is provided with a respective attenuator and switch, the switch being controllable by the control means to switch the attenuator into a transmission circuit to provide said reduction of the transmission power of that transmitter.

4,232,393

MUTING ARRANGEMENT OF A RADIO RECEIVER WITH A PHASE-LOCKED LOOP FREQUENCY SYNTHESIZER

Michiaki Kumaoka, and Sinzi Aosima, both of Shizuoka, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Shizuoka, Japan

Filed Dec. 21, 1978, Ser. No. 972,069
Claims priority, application Japan, Feb. 2, 1978, 53/11681[U]
Int. Cl.³ H04B *1/10, 1/16*
U.S. Cl. 455—154 **5 Claims**



1. A radio receiver comprising:

a signal transmission path including a mixer circuit for converting a radio-frequency signal into an intermediate frequency signal, an intermediate frequency amplifier for amplifying said intermediate frequency signal, and a detection circuit for demodulating said intermediate frequency signal;

a local oscillator circuit means having a phase-locked loop comprised of a voltage-controlled oscillator for providing a local-frequency signal to said mixer circuit, a frequency divider for dividing the output frequency of said voltage-controlled oscillator, a reference signal generator to produce a reference frequency signal, a phase comparator for comparing in phase said reference frequency signal with the output signal of said frequency divider, and a loop filter connected between said phase comparator and said voltage-controlled oscillator for supplying said voltage-controlled oscillator with a control voltage signal having a magnitude which is a function of the phase difference between the input signals of said phase comparator;

a non-lock detection circuit means connected to the output of said phase comparator for detecting a non-lock state of said phase-locked loop in which the output signals of said frequency divider and said reference signal generator are not coincident in phase; and

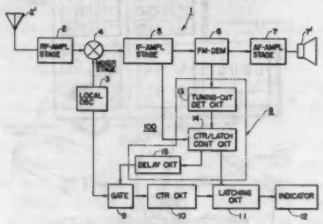
mute gate circuit means provided at the output side of said detection circuit of said signal transmission path of the receiver and responsive to said non-lock detection circuit means to mute the demodulated output signal at said signal transmission path, thereby interrupting production of an audio signal from the output of the receiver when the output signals of said frequency divider and signal reference signal generator are not coincident in phase.

4,232,394

STATION-SIGNAL FREQUENCY INDICATION SYSTEM FOR RADIO RECEIVER

Masakazu Fujishima, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Jun. 18, 1979, Ser. No. 49,788
Claims priority, application Japan, Jun. 22, 1978, 53-75636
Int. Cl.³ H04B *1/16*; G01R *21/10*
U.S. Cl. 455—158 **10 Claims**



1. A station-signal frequency indicating system for a radio receiver, comprising:

a counter circuit associated with said radio receiver for repetitively counting during a sequence of one or more counting periods a signal having a frequency related to a tuning frequency of said radio receiver to represent the tuning frequency of said radio receiver by a count obtained in said counter circuit at the end of each counting period for which counting is carried out by said counter circuit;

a latching circuit for receiving and temporarily retaining the count obtained in said counter circuit at the end of said each counting period;

an indicator means for displaying the count retained in said latching circuit; and

a control circuit coupled to said radio receiver for stopping said latching circuit from renewing its retaining count at the moment that said radio receiver becomes tuned exactly to a given station signal, and thereafter causing said latching circuit to keep its retaining count unchanged until said radio receiver becomes substantially detuned from said given station signal, whereby the frequency of said given station signal is displayed by said indicator means so long as this station signal is being received by said radio receiver.

4,232,395

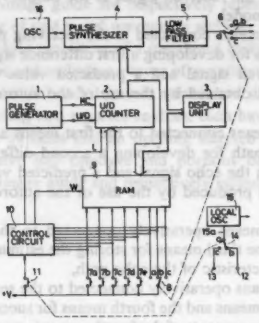
MULTIBAND RADIO RECEIVER WITH ELECTRONIC PRESET TUNING SYSTEM

Tomohisa Yokogawa, Kawagoe, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jun. 20, 1978, Ser. No. 917,227
Claims priority, application Japan, Jun. 20, 1977, 52/73120
Int. Cl.³ H04B *1/16*
U.S. Cl. 455—173 **2 Claims**

1. In a multiband radio receiver having an automatic frequency control signal source, a local oscillator, a reference biasing signal source and a digitally controlled preset tuning system which stores digital values corresponding to preset frequencies in response to the operation of a preset switch, the improvement characterized by an AFC switch normally operating to supply the output of said automatic frequency control signal source to said local oscillator, said AFC switch ganged with said preset switch such that when said preset switch is operated, said AFC switch is switched to supply the output of the said reference biasing signal source to said local oscillator, whereby when said preset switch is operated, said local oscilla-

tor provides a signal to said radio receiver under the control of said reference bias potential and at all other times provides a



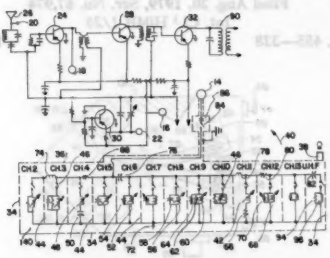
signal to said radio receiver under the control of said automatic frequency control signal source.

4,232,396

TELEVISION CHANNEL LOCK-OUT APPARATUS

Arnold S. Grimes, 7001 NW. 16th St., Apt. 413 A, Plantation, Fla. 33313

Filed Jul. 14, 1978, Ser. No. 924,633
Int. Cl.³ H04N 5/44
U.S. Cl. 455—179 **11 Claims**



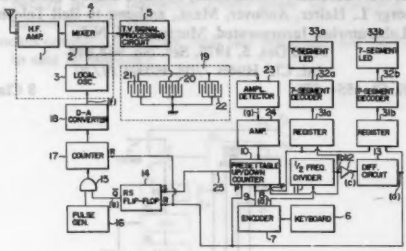
1. A television channel lock-out apparatus comprising a plurality of individual series circuits, each of said plurality of individual series circuits having at least one reactive element in series with an individual switch element, said individual series circuits having one end thereof coupled together, said individual switch element selectively coupling the other end of said individual series circuits together to one end of a parallel electrical circuit, said one end of said individual series circuits coupled to the other end of said parallel circuit, said parallel electrical circuit having said at least one reactive element coupled to one of a plurality of selected portions of a multi-channel television receiver circuit and a ground terminal thereof, said plurality of selected portions including a signal antenna terminal, a radio frequency amplifier terminal, a mixer input terminal and a local oscillator terminal of said receiver circuit, means for enabling said individual series circuits to be independently, selectively and concurrently coupled to said selected portion of said television receiver circuit so that said television receiver has a selected number of the otherwise operable channels which are thereby rendered inoperable.

4,232,397

AUTOMATIC CHANNEL SELECTION APPARATUS

Toshinori Murata, and Shigeo Matsuura, both of Yokohama, Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 25, 1978, Ser. No. 936,923
Claims priority, application Japan, Aug. 26, 1977, 52-101750
Int. Cl.³ H04B 1/32
U.S. Cl. 455—179 **5 Claims**



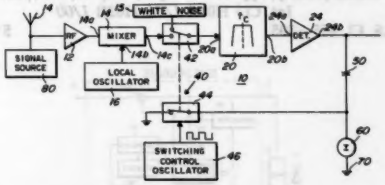
1. An automatic channel selection apparatus comprising:
an electronic tuner having a local oscillator an oscillation frequency of which is controlled in accordance with an applied voltage;
a voltage sweep circuit for sweeping the voltage to be applied to said local oscillator;
means for deriving from an output of said local oscillator, signals of different phases and combining said signals;
a detector for envelope-detecting an output of said meas; and
means for counting the number of the output signals of said detector which changes periodically each time the oscillation frequency of said local oscillator changes by a given amount which is inversely proportional to the phase difference between said signals to stop the voltage sweep of said voltage sweep circuit when the count reaches a specified count.

4,232,398

RADIO RECEIVER ALIGNMENT INDICATOR

Larrie A. Gould, Arlington, and Kim W. Reed, Fort Worth, both of Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 9, 1978, Ser. No. 876,386
Int. Cl.³ H04B 1/06
U.S. Cl. 455—226 **2 Claims**



1. Indicator means for indicating the relative alignment of an FM radio receiver, having a tuned intermediate frequency (IF) stage followed by a detector stage, which detector stage produces an output representative of the change in frequency of a signal applied at its input, comprising:
signal generator means for generating a predetermined frequency alignment signal and a noise source means for generating a random noise signal;
switching means for alternately coupling, at a predetermined rate, the predetermined frequency alignment signal and the noise signal to said IF stage; and
comparator means for comparing the output of said detector

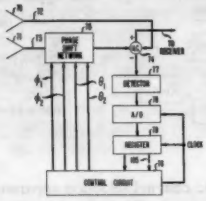
stage responsive to the predetermined frequency alignment signal being coupled to the IF stage with the output of said detector stage responsive to the noise signal being applied to said IF stage and producing an error signal indicative of the tuning of said IF stage with respect to said predetermined frequency alignment signal.

4,232,399

CONTINUOUSLY VARIABLE PHASE SHIFT NETWORK

George L. Heiter, Andover, Mass., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 5, 1978, Ser. No. 948,889
Int. Cl.[3] H04B 7/08; H03H 11/20
U.S. Cl. 455—276 **8 Claims**



5. A variable phase shift network having an input port (1) and an output port (2) including:

a first wavepath (10) including first phase shifting means (11) capable of producing a phase shift that is continuously variable between at least 0 and 180 degrees;

a second wavepath (12) including second phase shifting means (13) capable of producing a phase shift that is continuously variable at least between 180 and 360 degrees;

characterized by:

switching means (14) for connecting one or the other of said wavepaths (10 or 12) between the input port (1) and the output port (2) of said network;

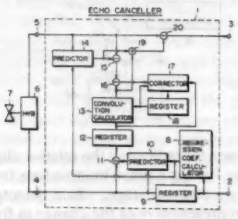
and a control circuit (15) for causing the phase shifts simultaneously produced by said phase shifting means (11, 13) to vary oppositely to each other, and for activating said switching means.

4,232,400

ECHO CONTROL SYSTEM

Seiichi Yamamoto, and Seishi Kitayama, both of Tokyo, Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan

Filed May 8, 1979, Ser. No. 37,176
Claims priority, application Japan, May 16, 1978, 53/57129
Int. Cl.[2] H04B 1/16; H03B 1/00
U.S. Cl. 455—305 **5 Claims**



1. In an echo control system for an adaptive echo canceller which cancels an echo signal while successively estimating the transmission characteristic of an echo path by the use of a received signal to a receiving path and the echo signal passing the echo path from the receiving path and a transmission path, the improvement comprising:

first means connected to the receiving path for developing from the received signal for each of successive predetermined durations an autoregression coefficient in a case of using the received signal as the output of an autoregressive model,

second means connected to the receiving path and the first means for developing a first difference signal between the received signal and a predicted value of the received signal obtained by the use of the autoregression coefficient,

third means connected to the first means and the transmission path for developing a second difference signal between the echo signal and a predicted value of the echo signal produced by the use of the autoregression coefficient,

fourth means operatively connected to the second means and the third means for storing the estimated transmission characteristic of the echo path,

fifth means operatively connected to the second means, the third means and the fourth means for successively correcting the contents of the fourth means in accordance with an identification method by learning by the use of the first difference signal and the second difference signal,

sixth means connected to the fourth means for developing an echo replica, and

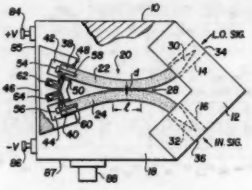
seventh means inserted in the transmission path and connected to the sixth means for subtracting the echo replica from the echo signal to substantially cancel the echo signal.

4,232,401

MILLIMETER WAVE IMAGE GUIDE INTEGRATED BALANCED MIXER

Yu-Wen Chang, Rancho Palos Verdes, and Jeffrey A. Paul, Torrance, both of Calif., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 20, 1979, Ser. No. 67,974
Int. Cl.[3] H04B 1/26
U.S. Cl. 455—328 **11 Claims**



1. A millimeter image waveguide balanced mixer integrated circuit adapted to be powered from a source of electrical power and coupled to IF amplifier means, comprising in combination:

a metal substrate having a conductive surface defining an image plane;

two adjacent lengths of image guide consisting of dielectric material having a relatively low propagation loss to millimeter wave signals applied thereto and including a layer of metallization on one surface thereof which is bonded to said conductive surface, said length of image waveguides having an intermediate signal coupling region consisting of a slot type of separation of predetermined length and width to provide a signal coupling region;

image waveguide to metal waveguide transition means consisting of a portion of said conductive surface and a metal body having a pair of rectangular or cross-sectional channels formed in one surface thereof which is secured to said conductive surface to form a pair of hollow metal waveguide sections providing first and second signal ports, are

respectively adapted to receive an input signal and a local oscillator signal and wherein like end portions of said two lengths of image guide are respectively tapered and located inside of said metal waveguide sections;

a cavity structure consisting of a metallized body of dielectric material and including a layer of metallization on one surface which is bonded to said conductive surface, said body including two separate cavities, each having metallized outer surfaces and an opening adapted to respectively receive like opposite end portions of said two lengths of image guide and respectively including decoupling slots on either side of said image guide for decoupling the image guides from the respective cavities,

said end portions additionally having conductor line patterns formed on the upper surface of the respective image guides opposite said one surface for coupling IF signals away from said cavities;

an active millimeter wave mixer device located in each of said cavities and including means for being coupled to said source of electrical power and being coupled to said line pattern of the respective image guide for coupling IF signals thereto; and

means coupling IF signals from said respective line patterns to said IF amplifier.

DESIGNS

GRANTED NOV. 4, 1980

ERRATA

For CLASS	See PATENT NO.
D99–047	257,478

DESIGNS

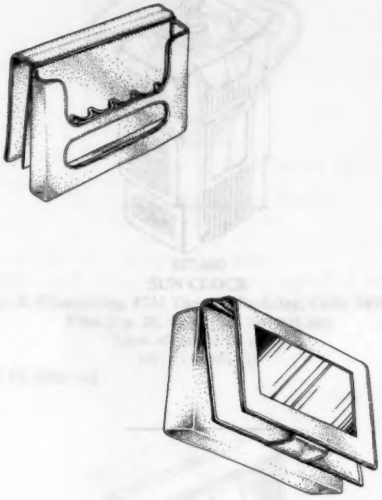
GRANTED NOV. 4, 1980

ERRATA

For	Read
CLASS	PATENT NO.
D29-047	257,478

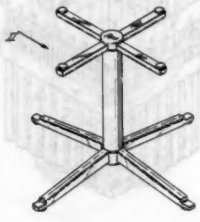
257,471
PURSE

Milton I. Siegel, 767 Weemac Rd., Martinsville, N.J. 08836
Filed May 15, 1978, Ser. No. 906,143
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D3—52



257,472
LOUDSPEAKER STAND

Timothy J. F. Roach, 6 Old Slade La., Iver, Buckinghamshire, England
Filed Dec. 19, 1978, Ser. No. 971,476
Claims priority, application United Kingdom, Jun. 29, 1978, 985234/78
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—29

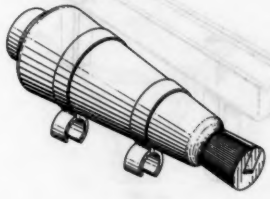


257,473
BAR STOOL

Robert L. Wilson, Senatobia, Miss., assignor to Chromcraft Corporation, Amsterdam, N.Y.
Filed Oct. 17, 1977, Ser. No. 842,771
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—35

257,474
LIQUID DISPENSER FOR MOUNTING ON SHOWERS

Jacqueline L. McDonald, 5000 Oak St.; Donald C. Eyer, 415 W. 49th Ter., both of Kansas City, Mo. 64112, and Russell S. Jones, 7402 W. 62nd St., Shawnee Mission, Kans. 66202
Filed Oct. 12, 1978, Ser. No. 950,804
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—95



257,475

COFFEEMAKER OR THE LIKE

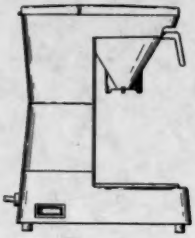
Detlef M. T. von der Luehe, Repulse Bay, Hong Kong, assignor to Melitta, Inc.

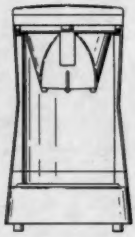
Filed Jul. 19, 1978, Ser. No. 926,002

Term of patent 14 years

Int. Cl. D7—*02*

U.S. Cl. D7—41





257,476

HANDLE FOR GLASS FIREPLACE SCREEN

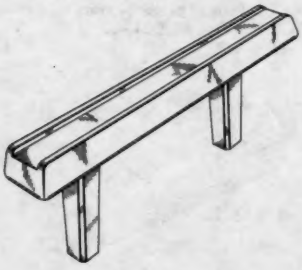
W. James Sirois, Beaverton, Oreg., assignor to Pacific Fireplace Furnishings, Inc., Tualatin, Oreg.

Filed Jul. 2, 1979, Ser. No. 53,841

Term of patent 14 years

Int. Cl. D8—*06*

U.S. Cl. D8—316



257,477

BOTTLE

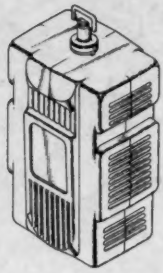
Raymond F. DeLuca, 15 Whittaker St., Stamford, Conn. 06902

Filed Mar. 28, 1978, Ser. No. 891,478

Term of patent 14 years

Int. Cl. D9—*01*

U.S. Cl. D9—408



257,478

EGG CRATE OR SIMILAR ARTICLE

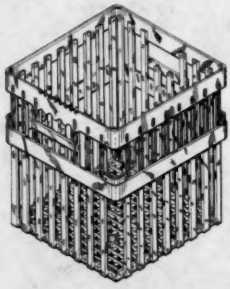
James C. Carroll, and Victor D. Johns, both of Hopkinsville, Ky., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 13, 1978, Ser. No. 959,953

Term of patent 14 years

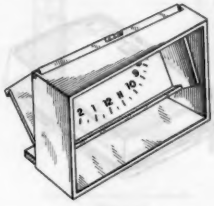
Int. Cl. D9—*04*

U.S. Cl. D99—47



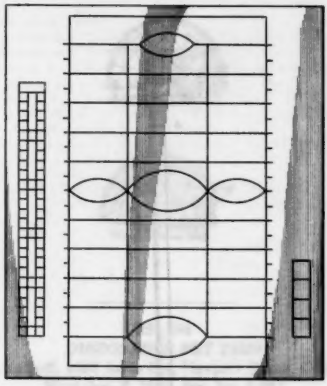
257,479
WATCH
Alain Carré, Paris, France, assignor to Waterman S.A., Paris, France
Filed Oct. 3, 1978, Ser. No. 948,654
Claims priority, application France, Apr. 7, 1978, 78 76482
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—30

257,480
SUN CLOCK
Scott R. Glendinning, 1731 Tacoma, Berkeley, Calif. 94707
Filed Sep. 25, 1978, Ser. No. 945,186
Term of patent 14 years
Int. Cl. D10—*03*
U.S. Cl. D10—45

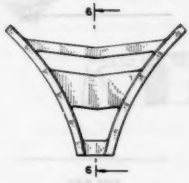


257,481
BORING TOOL HOLDER
Samuel Mazliach, Miami, Fla., assignor to Automotive Parts Industries, Inc.
Filed Oct. 2, 1978, Ser. No. 947,777
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—140

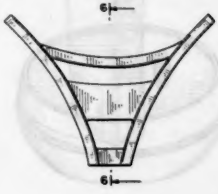
257,482
FOOTBALL GAME DART BOARD
Blake C. Leduc, 1571 E. 195th St., Euclid, Ohio 44117
Filed Apr. 13, 1978, Ser. No. 895,951
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—6



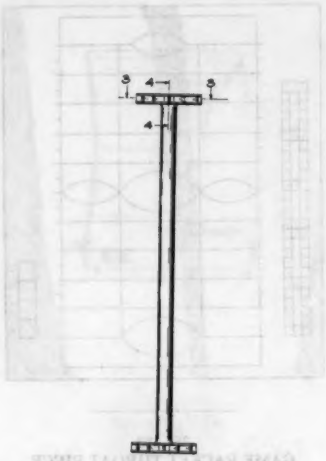
257,483
GAME RACKET THROAT PIECE
Charles A. Drake, San Diego, Calif., assignor to Leach Industries
Filed Feb. 8, 1979, Ser. No. 10,332
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D21—212



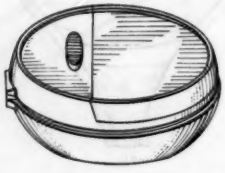
257,484
GAME RACKET THROAT PIECE
Charles A. Drake, San Diego, Calif., assignor to Leach Industries
Filed Feb. 8, 1979, Ser. No. 10,293
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D21—212



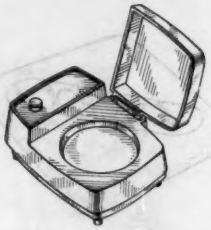
257,485
ROOM HEAT RECIRCULATOR
Lawrence G. Montecalvo, 5845 Shafer Rd., Warren, Ohio 44481
Filed Dec. 26, 1979, Ser. No. 107,451
Term of patent 14 years
Int. Cl. D23—04
U.S. Cl. D23—151



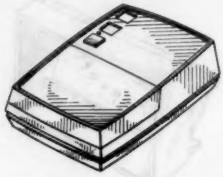
257,486
STERILIZER UNIT
Michael D. Thomas, Arab, Ala., assignor to Ryder International Corporation, Arab, Ala.
Filed Feb. 21, 1978, Ser. No. 879,100
Term of patent 14 years
Int. Cl. 24—02
U.S. Cl. D24—9



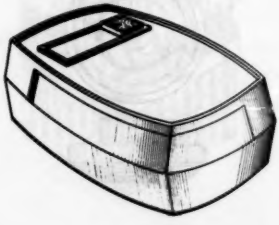
257,487
STERILIZER UNIT
Michael D. Thomas, Arab, Ala., assignor to Ryder International Corporation, Arab, Ala.
Filed Feb. 21, 1978, Ser. No. 879,623
Term of patent 14 years
Int. Cl. 24—02
U.S. Cl. D24—9



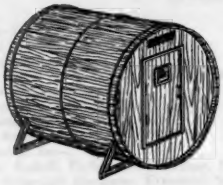
257,488
STERILIZER UNIT
Michael D. Thomas, Arab, Ala., and Francis E. Ryder, Barrington, Ill., assignors to Ryder International Corporation, Arab, Ala.
Filed Feb. 21, 1978, Ser. No. 879,713
Term of patent 14 years
Int. Cl. 24—02
U.S. Cl. D24—9



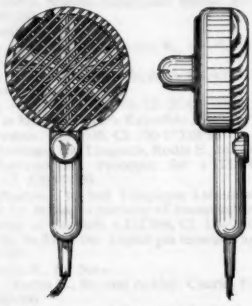
257,489
DISINFECTOR CASING FOR CONTACT LENS OR THE LIKE
Michael D. Thomas, Arab, Ala., and Francis E. Ryder, Barrington, Ill., assignors to Ryder International Corporation, Arab, Ala.
Filed Oct. 12, 1978, Ser. No. 951,055
Term of patent 14 years
Int. Cl. D24—01
U.S. Cl. D24—9



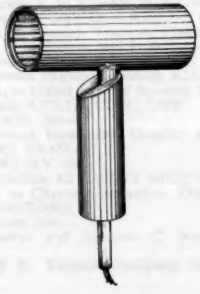
257,490
SAUNA
Ronald C. Davis, 1243 Law St., San Diego, Calif. 92109
Filed Feb. 21, 1979, Ser. No. 13,084
Term of patent 14 years
Int. Cl. D24—*99*; D25—*02*
U.S. Cl. D24—37



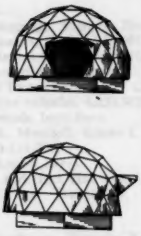
257,491
HAIR DRYER
Morison S. Cousins, New York, N.Y., assignor to The Gillette Company, Boston, Mass.
Filed Dec. 18, 1978, Ser. No. 970,743
Term of patent 14 years
Int. Cl. D28—*3*
U.S. Cl. D28—13



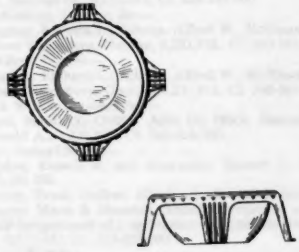
257,492
HAIR DRYER
Morison S. Cousins, New York, and Michael A. Cousins, Huntington, both of N.Y., assignors to The Gillette Company, Boston, Mass.
Filed Dec. 18, 1978, Ser. No. 970,745
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—13



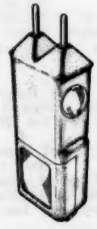
257,493
DOG HOUSE
Lawrence E. Lodrick, 2436 Harrison Ave. North, Rochester, Mich. 48063
Filed Mar. 5, 1979, Ser. No. 17,123
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—1



257,494
DISPOSABLE PET DISH
Kathy S. Imhoff, 1609 Anita La., Newport Beach, Calif. 92660
Filed Jan. 4, 1979, Ser. No. 1,012
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—16



257,495
HOUSING FOR AN ELECTRIC CATTLE PROD
Daniel M. Bros, Edina; William G. Bartel, Wayzata, and LaVerne M. Larsen, Edina, all of Minn., assignors to Hot Shot Products Co., Savage, Minn.
Filed May 29, 1979, Ser. No. 43,481
Term of patent 14 years
Int. Cl. D30—*05*
U.S. Cl. D30—32



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 4TH DAY OF NOVEMBER, 1980

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A & C Boehmer Limited: *See—*
Beard, John M., 4,231,510, Cl. 229-39.00B.

A. P. Green Refractor: *See—*
Crookston, James A., 4,231,978, Cl. 264-63.000.

A/S Akers Mek. Verksted: *See—*
Fladby, Tron-Halvard, 4,231,870, Cl. 210-797.000.

A/S Raufoss Ammunisjonsfabrikker: *See—*
Byfuglien, Arne, 4,231,393, Cl. 137-491.000.

A.W. Faber-Castell: *See—*
Rosbiegalle, Rudolf; Farber, Karl; Grimm, Herbert; Schmeisser, Helmut; Schonhut, Hermann; Krumnikl, Svatopluk; and Edel, Gunter, 4,231,669, Cl. 401-258.000.

AB Volvo: *See—*
Bohlin, Nils I., 4,231,607, Cl. 296-63.000.
Jansson, Hans B. E., 4,231,982, Cl. 264-112.000.
Jonasson, Kjell O.; and Andersson, Sven A., 4,231,613, Cl. 297-250.000.

AB Volvo Penta: *See—*
Brandt, Lennart H.; and Mansson, Staffan T., 4,231,317, Cl. 440-50.000.

AB Ziristor: *See—*
Palm, Lars-Erik; Nedstedt, Gert; and Nilen, Bengt, 4,232,048, Cl. 426-115.000.

Abadie, Albert: *See—*
Marty, Didier; Abadie, Albert; and Mustin, Michel, 4,231,864, Cl. 210-669.000.

Abbott Laboratories: *See—*
Tadanier, John S.; Martin, Jerry R.; and Kurath, Paul, 4,231,924, Cl. 260-112.50R.
Tadanier, John S.; and Martin, Jerry R., 4,232,147, Cl. 536-4.000.

ABC Elevators, Inc.: *See—*
Harding, Allen W., 4,231,148, Cl. 29-469.000.

Abe, Haruo, to Minolta Camera Kabushiki Kaisha. Variable field curvature lens system. 4,231,636, Cl. 350-175.0FS.

Acampora, Anthony; and Langseth, Rollin E., to Bell Telephone Laboratories, Incorporated. Processor for a TDMA burst modem. 4,232,197, Cl. 370-97.000.

Acampora, Anthony, to Bell Telephone Laboratories, Incorporated. Technique for sharing a plurality of transponders among a same or larger number of channels. 4,232,266, Cl. 370-79.000.

Acker, Roy M., to TRW Inc. Liquid-gas separator apparatus. 4,231,767, Cl. 55-186.000.

Ackley, Charles E., Jr.: *See—*
Ackley, Charles E., Sr.; and Ackley, Charles E., Jr., 4,231,462, Cl. 198-380.000.

Ackley, Charles E., Sr.; and Ackley, Charles E., Jr., to R. W. Hartnett Company. Capsule positioning guide and associated vacuum manifold for capsule orienting mechanisms. 4,231,462, Cl. 198-380.000.

Acutherm, Inc.: *See—*
Vance, Robert L.; and Noll, Robert W., 4,231,513, Cl. 236-49.000.

Adachi, Akio: *See—*
Yasuda, Katsuya; and Adachi, Akio, 4,232,292, Cl. 340-147.0SY.

Adachi, Keiichi; Shishido, Tadao; and Mitsui, Akio, to Fuji Photo Film Co., Ltd. Color photographic light-sensitive elements containing anti-color fogging agents. 4,232,114, Cl. 430-504.000.

Adams, Halbert E.; Cooper, Edgar R.; Ford, Lowell D.; Johnson, Delbert C.; and Warren, Gregory L., to Standard Oil Company (Indiana). Formation absorption seismic method. 4,232,378, Cl. 367-36.000.

Adams, Jerry. Foliage guide. 4,231,185, Cl. 47-1.00R.

Adams, Robert H., to Ocean Technology, Inc. Voice encryption system. 4,232,194, Cl. 179-1.50R.

Adelsperger, Frederic J., to Republic Steel Corporation. Chute with hazardous flame and fume control. 4,231,792, Cl. 75-53.000.

Adigamov, Engel R.; Gurvich, Yakov A.; Liakumovich, Alexandr G.; Logutov, Igor J.; Michurov, Jury I.; Polenov, Alexei S.; and Yanshevsky, Vladimir A. Method for removing aluminum-containing catalyst from phenol alkylation products. 4,232,176, Cl. 568-756.000.

Adrian, Donald J., to United States of America, Navy. FM Autocorrelation fuze system. 4,232,314, Cl. 343-7.0PF.

AGFA-Gevaert, A.G.: *See—*
Waibel, Gottfried; Maurischat, Gunther; and Webersik, Heinz, 4,231,319, Cl. 118-655.000.

AGFA-GEVAERT N.V.: *See—*
Janssens, Wilhelmus, 4,232,107, Cl. 430-223.000.

Agneta, Roi D., to Chyron Corporation. Color display apparatus. 4,232,311, Cl. 340-703.000.

Ahlquist, C. Norman: *See—*
Somekh, Sasson; and Ahlquist, C. Norman, 4,231,811, Cl. 148-1.500.

Ahlrich, Willard K. Filtered ventilating system. 4,231,769, Cl. 55-242.000.

Aihara, Takayuki: *See—*
Sogi, Shinroku; Yoshinaga, Makoto; Shinohara, Toshio; Aihara, Takayuki; and Tawara, Ikuo, 4,231,403, Cl. 141-284.000.

Aileo, Jackson A., to Gentex Corporation. Helmet assembly for accurately positioning visual display system. 4,231,117, Cl. 2-6.000.

Aimar, Michele, to ITW Fastex Italia S.p.A. Cap and filler assembly for fuel tanks of automotive vehicles. 4,231,485, Cl. 220-210.000.

Air Products and Chemicals, Inc.: *See—*
Bechara, Ibrahim S.; Mascioli, Rocco L.; and Zaluska, Philip J., 4,232,152, Cl. 544-119.000.

Aisin Seiki Kabushiki Kaisha: *See—*
Nakane, Mototaka; and Hori, Hideichi, 4,231,456, Cl. 192-70.250.
Ohumi, Takeharu; and Tsunekawa, Masaru, 4,231,347, Cl. 123-512.000.

Aizawa, Tatsuo: *See—*
Fukuda, Hideo; Morikawa, Hiroichi; Kamezawa, Yasutoki; and Aizawa, Tatsuo, 4,232,101, Cl. 430-56.000.

Ajax Tool Works, Inc.: *See—*
Benedict, Neil W., 4,231,581, Cl. 279-19.400.

Akerman, Emanuel: *See—*
Pomper, Seymour; and Akerman, Emanuel, 4,232,045, Cl. 426-62.000.

A.G. fur industrielle Elecktronik AGIE Losone b. Locarno: *See—*
Buhler, Ernst, 4,232,208, Cl. 219-69.00W.

Akzona Incorporated: *See—*
Campbell, Alexander C.; Hewett, Colin L.; and Zeelen, Filippus J., 4,232,042, Cl. 424-308.000.
Grise, Ernest J., Jr., 4,231,219, Cl. 57-290.000.

Albany International Corp.: *See—*
Quinan, James R., 4,231,498, Cl. 222-602.000.
Trask, Elwood G., 4,232,087, Cl. 428-389.000.

Albers-Schonberg, George: *See—*
Monaghan, Richard L.; Alberts, Alfred W.; Hoffman, Carl H.; and Albers-Schonberg, George, 4,231,938, Cl. 260-343.500.

Alberts, Alfred W.: *See—*
Monaghan, Richard L.; Alberts, Alfred W.; Hoffman, Carl H.; and Albers-Schonberg, George, 4,231,938, Cl. 260-343.500.

Albright & Wilson Limited: *See—*
Ceprini, Mario Q.; Collins, John D.; Hoch, Samuel; and Wood, Donald A., 4,231,949, Cl. 260-429.700.

Alexander, Samuel S.: *See—*
Hodgdon, Russell B.; and Alexander, Samuel S., 4,231,855, Cl. 204-301.000.

Alf, Herbert; Ernst, Volker; Hainle, Rudi; and Leipelt, Rudolf, to Filterwerke Mann & Hummel GmbH. Device for controlling the intake air temperature of a carburetor-equipped internal combustion engine. 4,231,343, Cl. 123-556.000.

Alfa-Laval AB: *See—*
Olander, Karl E., 4,231,323, Cl. 119-14.080.

Alfa Romeo S.p.A.: *See—*
Garcea, Giampaolo, 4,231,330, Cl. 123-90.150.

Alfred Walter AG: *See—*
Walter, Alfred, 4,231,273, Cl. 83-510.000.

All American Industries, Inc.: *See—*
Schlegel, William R.; and Mayhew, Harry E., 4,231,535, Cl. 244-110.00C.

Allegheny Ludlum Industries, Inc.: *See—*
Henke, Robert H., 4,231,818, Cl. 148-111.000.

Allibert, Jean-Pierre, to Regie Nationale des Usines Renault. Color-changing valve for an automatic painting machine. 4,231,392, Cl. 137-454.200.

Allied Chemical Corporation: *See—*
Grey, Roger A.; and Pez, Guido P., 4,232,170, Cl. 560-179.000.
Pez, Guido P., 4,231,948, Cl. 260-429.500.

Allis-Chalmers Corporation: *See—*
Klas, Kenneth H., 4,231,215, Cl. 56-11.600.

Alsberg, Dietrich A., to Bell Telephone Laboratories, Incorporated. Beam-switched traveling wave tube. 4,232,249, Cl. 315-3.600.

Amax Inc.: *See—*
Schaeffer, Bernard J., 4,231,528, Cl. 241-182.000.

American Cyanamid Company: *See—*
Fanshawe, William J.; Epstein, Joseph W.; Crawley, Lantz S.; Hofmann, Corris M.; and Safir, Sidney R., 4,231,935, Cl. 260-326.50B.
Nair, Vijay G.; Joseph, Joseph P.; and Bernstein, Seymour, 4,232,150, Cl. 536-119.000.
Siuta, Gerald J.; Conrow, Ransom B.; Poletto, John F.; and Bernstein, Seymour, 4,231,958, Cl. 260-507.00R.
Wang, Samuel S.; and Lewellyn, Morris E., 4,231,868, Cl. 210-728.000.
Wissner, Allan, 4,232,166, Cl. 560-121.000.

American District Telegraph Company: *See*—
Marsocci, Angelo A., 4,232,307, Cl. 340-515.000.
American Gilsonite Company: *See*—
Dorius, Carl B., 4,231,884, Cl. 252-62.000.
American Home Products Corporation: *See*—
Bender, Reinhold H. W., 4,231,954, Cl. 260-465.00D.
Garsky, Victor M., 4,231,925, Cl. 260-112.50R.
Philipp, Adolf H.; and Jirkovsky, Ivo L., 4,232,029, Cl. 424-263.000.
American National Red Cross: *See*—
Dodd, Roger Y., 4,232,004, Cl. 424-89.000.
American Optical Corporation: *See*—
Siegmund, Walter P., 4,231,775, Cl. 65-30.00E.
Sussman, Milton H., 4,231,637, Cl. 350-175.0ML.
American Precision Industries, Inc.: *See*—
McElheny, Donald C., 4,231,985, Cl. 264-262.000.
American Safety Equipment Corporation: *See*—
Close, Albert R., 4,231,591, Cl. 280-806.000.
Ames, Foerd. Ocean wave energy converter. 4,232,230, Cl. 290-53.000.
AMP Incorporated: *See*—
Hughes, Donald W. K.; and Lauterbach, John H. F., 4,231,628, Cl. 339-17.0LC.
Ampex Corporation: *See*—
Harshberger, Robert P., Jr., 4,232,257, Cl. 318-314.000.
Amtmann, James S.; and Bobrowski, Louis G., to Stanley Works, The. Storage system. 4,231,626, Cl. 312-350.000.
Andersen, Bjarne B.: *See*—
Mikkelsen, Henrik; and Andersen, Bjarne B., 4,231,203, Cl. 52-284.000.
Anderson Bros. Mfg. Co.: *See*—
Stohlquist, Roger H.; and Strombeck, Leo, 4,231,560, Cl. 493-29.000.
Anderson, J. Hilbert, to Sea Solar Power. Heat exchanger with controls therefor. 4,231,420, Cl. 165-40.000.
Andersson, Sven A.: *See*—
Jonasson, Kjell O.; and Andersson, Sven A., 4,231,613, Cl. 297-250.000.
Ando, Kunio: *See*—
Sakurai, Soichi; Ando, Kunio; and Fukuzawa, Kenichi, 4,232,246, Cl. 313-414.000.
Ando, Shigeo; and Kondou, Takayasu, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument of waveshape memory type. 4,231,276, Cl. 84-1.190.
Andrea Doria: *See*—
Raiteri, Angelo, 4,231,212, Cl. 53-459.000.
Andreasson, Lars I. Tool for use primarily in conjunction with a rock-breaker unit. 4,231,435, Cl. 173-128.000.
Andres, Rudolf: *See*—
Scherenberg, Hans O.; and Andres, Rudolf, 4,231,592, Cl. 280-808.000.
Andrew Corporation: *See*—
Savalle, Rene, Jr., 4,232,320, Cl. 343-765.000.
Anheuser-Busch Incorporated: *See*—
Bovier, Edward M.; and Carter, James A., 4,231,803, Cl. 106-213.000.
Anspack, Inc.: *See*—
Spransy, George B., 4,231,480, Cl. 215-329.000.
Antibiotics, S.A.: *See*—
Coll, Antonio L. P.; and Meseguer, Jose D., 4,232,162, Cl. 548-111.000.
Antivols Simplex: *See*—
Thirion, Andre, 4,231,243, Cl. 70-364.00A.
Antonello, Luis M. Manual and automatic control device for electronic equipment and others. 4,231,263, Cl. 74-10.330.
Antos, George J., to UOP Inc. Attenuated superactive multimetallic catalytic composite. 4,231,897, Cl. 252-441.000.
Aosima, Sinzi: *See*—
Kumaoka, Michiaki; and Aosima, Sinzi, 4,232,393, Cl. 455-154.000.
Applied Materials, Inc.: *See*—
Rosler, Richard S.; and East, Robert W., 4,232,063, Cl. 427-94.000.
Aprahamian, Vaughn, to Le-Bo Products Co., Inc. Dual purpose insert for tape cartridges and cassettes. 4,231,473, Cl. 206-387.000.
Aprea, George F.; and Pohle, Werner P., to Wm. Steinen Mfg. Co. Large flow nozzle. 4,231,524, Cl. 239-468.000.
Arai, Yoshinobu: *See*—
Hayashi, Masaki; Arai, Yoshinobu; Ohuchida, Shuichi; and Hashimoto, Shinsuke, 4,232,009, Cl. 424-180.000.
Arakawa, Hideo: *See*—
Watanabe, Ryuji; Arakawa, Hideo; and Kuniya, Keiichi, 4,231,814, Cl. 148-11.50C.
Arikawa, Junichi: *See*—
Miyagawa, Tuyoshi; and Arikawa, Junichi, 4,231,564, Cl. 271-95.000.
Arita, Tomohiko: *See*—
Murakami, Kaoru; Okahisa, Mitsugu; Arita, Tomohiko; and Kumano, Hiroshi, 4,231,889, Cl. 252-182.100.
Armstrong Cork Company: *See*—
Buckwalter, Mervin R.; Bulson, Walter T.; and Ray, Leonard N., Jr., 4,231,743, Cl. 8-471.000.
Armstrong, Kenneth R., to Dresser Industries, Inc. Flow method and device. 4,231,971, Cl. 261-44.00B.
Arscott, John R., to Ling Systems Limited. Conveyor. 4,231,469, Cl. 198-779.000.
Arzoumanian, Philippe. Toy tube train. 4,231,294, Cl. 104-138.00R.
Asanae, Masumi; and Yamashita, Keitaro, to Hitachi Metals, Ltd. Magnetic brush-toner supply hopper. 4,231,320, Cl. 118-657.000.
ASEA Aktiebolag: *See*—
Dahle, Orvar; Einarsson, Olov; Lindkvist, Folke; and Valdemarsson, Stefan, 4,231,145, Cl. 29-432.000.
Ashes, John R.: *See*—
Peck, Norman J.; Rowland, Thomas J.; and Ashes, John R., 4,231,529, Cl. 241-189.00R.
Ashley, ugene, to General Electric Company. Ignition system. 4,231,282, Cl. 89-7.000.
Associated Concrete Products, Inc.: *See*—
Dunton, Harvey R., 4,231,801, Cl. 106-97.000.
Astra Lakemedel Aktiebolag: *See*—
Florvall, Gosta L.; and Ogren, Sven O., 4,232,037, Cl. 424-274.000.
Atchison, Cheryle M. Surgical dressing. 4,231,358, Cl. 128-168.000.
Aterianus, John S.; and Crawford, Donald C., to FMC Corporation. Apparatus for accumulating articles such as bags. 4,231,558, Cl. 270-60.000.
ATEX/U.S.A., Inc.: *See*—
Giorgetti, Maurizio, 4,231,906, Cl. 260-19.00N.
Atkinson, Ward J.: *See*—
Widdowson, Richard E.; and Atkinson, Ward J., 4,231,713, Cl. 417-222.000.
Atlantic Richfield Company: *See*—
Kao, Jar-lin; and Sheng, Ming N., 4,231,937, Cl. 260-340.200.
Auergesellschaft GmbH: *See*—
Zloczysti, Stefan; and Woike, Bernd, 4,231,360, Cl. 128-201.180.
Auger, Edward J.: *See*—
McGuire, John J.; and Auger, Edward J., 4,231,188, Cl. 47-80.000.
Augier, Robert; Carbonari, Jean P.; and Eliche, Jean, to Societe Anonyme de Recherche et d'Etudes Techniques. Jointing device for long-limbed framework elements in reinforced concrete and framework comprising framework elements jointed by such devices. 4,231,198, Cl. 52-91.000.
Austin, John J., to Champion International Corporation. Package and blank therefor. 4,231,509, Cl. 229-22.000.
Axen, Rolf E. A. V.: *See*—
Carlsson, Jan P. E.; Axen, Rolf E. A. V.; and Drevin, Hakan N. Y., 4,231,999, Cl. 424-1.000.
Carlsson, Jan P. E.; Axen, Rolf E. A. V.; and Drevin, Hakan N. Y., 4,232,119, Cl. 435-7.000.
Aya, Kazim K. Turbocharged engine with pressurized gas recirculation. 4,231,225, Cl. 60-612.000.
Ayache, Michel R.; Delonge, Jean-Claude L.; and Marey, Daniel J., to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation. Cooling fluid bleed for axis of turbine rotor. 4,231,704, Cl. 416-95.000.
Babcock & Wilcox Company, The: *See*—
Boll, Richard H., deceased; and Ghering, Walter L., 4,231,262, Cl. 73-861.040.
Babler, Fridolin, to Ciba-Geigy Corporation. Process for the mass coloration of linear polyesters. 4,231,918, Cl. 260-40.00P.
Backx, Leo J. J.: *See*—
Heeres, Jan; Backx, Leo J. J.; and Mostmans, Joseph H., 4,232,034, Cl. 424-269.000.
Badoz, Jean-Marie; and Merceron, Daniel, to Socapex; and Souriau et Cie. Contact element for insulation pierce type. 4,231,632, Cl. 339-97.00R.
Bahr, Theodor: *See*—
Ortner, Herbert; Bahr, Theodor; and Musselmann, Walter, 4,231,526, Cl. 241-28.000.
Baichtal, James R.: *See*—
McDonald, John C.; Baichtal, James R.; and Ling, Alexander C., 4,232,386, Cl. 370-68.000.
Baird, William C., Jr.: *See*—
Mauldin, Charles H.; and Baird, William C., Jr., 4,231,898, Cl. 252-441.000.
Baisden, C. Robert. Exhaust gas pollution control system. 4,231,763, Cl. 55-1.000.
Baker, William R., to United States of America, Energy. High-voltage crowbar circuit with cascade-triggered series ignitrons. 4,232,351, Cl. 361-56.000.
Bakshi, Kiran R.: *See*—
Paradis, Stephen G.; Marquis, David M.; and Bakshi, Kiran R., 4,231,943, Cl. 260-346.750.
Balch, Duane C. Locking crankcase drain valve assembly. 4,231,544, Cl. 251-144.000.
Baldi, Luciano; Francese, Renato; and Collecchia, Franco, to Rumianca S.p.A. Process for the production of chloro-di (alkylamino)-s-triazines. 4,232,153, Cl. 544-204.000.
Ball Corporation: *See*—
Marcantonio, Arnold F.; and Dailey, Rodney E., 4,232,065, Cl. 427-226.000.
Pardee, Robert P., 4,232,072, Cl. 428-65.000.
Balland, Jean, to Manufacture de Produits Chimiques Protex Societe Anonyme. Dyeing process using a sequestrating agent. 4,231,749, Cl. 8-584.000.
Balligand, Pierre; Corfa, Yves; Lemercier, Pierre; Marchal, Paul; and Vertut, Jean, to Commissariat a l'Energie Atomique. Method and apparatus for mining nodules from beneath the sea. 4,231,171, Cl. 37-54.000.
Banda, Syunji, to Kabushiki Kaisha Suwa Seikosha. Poly-layer liquid crystal display device. 4,231,639, Cl. 350-335.000.
Bandtel, Eberhard: *See*—
Schmidt, Manfred; Bandtel, Eberhard; Traudisch, Walter; Spott, Georg; and Freitag, Dieter, 4,232,134, Cl. 525-506.000.
Banka, Eugene F.: *See*—
Juziuk, Jurgen A.; Mack, Ronald H.; Banka, Eugene F.; and Nicol, Edward A., 4,232,217, Cl. 235-480.000.

Baraff, David R.; and Hobbs, Lawrence H., to Northern Telecom Limited. Thermal printers. 4,232,212, Cl. 219-216.000.

Barbee, Eugene H., to Eastman Kodak Company. Apparatus and method for uniformly heating or cooling a moving web. 4,231,164, Cl. 34-16.000.

Barber, Jacques: *See*—
Guerinault, Jean-Marc; and Barber, Jacques, 4,231,631, Cl. 339-94.00A.

Barber, William H.: *See*—
Beckert, Werner F.; Barber, William H.; and Dengel, Ottmar H., 4,231,891, Cl. 252-188.000.

Bare, W. Wayne, to Bare, W. Wayne. Disposable animal trap. 4,231,180, Cl. 43-61.000.

Barger, Frank L.: *See*—
Sequeira, Avilino, Jr.; and Barger, Frank L., 4,231,459, Cl. 196-46.000.

Barmag Barmer Maschinenfabrik Aktiengesellschaft: *See*—
Hertell, Siegfried, 4,231,728, Cl. 418-79.000.

Baron, John, to E. T. Oakes Limited. Mixing apparatus. 4,231,666, Cl. 366-304.000.

Barr, Dennis A.; and Rose, John B., to Imperial Chemical Industries Limited. Production of polyarylene ether sulphones and ketones. 4,232,142, Cl. 528-125.000.

Barre, Rene E. L. Apparatus for molding glass objects with tongs and spades. 4,231,779, Cl. 65-323.000.

Barrineau, Wade H., III. Adjustable shelf assembly. 4,231,301, Cl. 108-146.000.

Barron, John W.; and Van Moorsel, William H., to CF Industries, Inc. After-treatment processes and apparatus, especially for urea and ammonium nitrate plants. 4,231,839, Cl. 159-47.0UA.

Bartelink, Everhard H. B. Telephone responder apparatus. 4,232,195, Cl. 179-2.00A.

Bartley, Erle E.: *See*—
Deyoe, Charles W.; and Bartley, Erle E., 4,232,046, Cl. 426-69.000.

Barylo, Ivan I.: *See*—
Kuznetsov, Vyacheslav D.; Preobrazhensky, Boris P.; Rozhnov, Valentin E.; Stepanov, Jury V.; Belitsky, Anatoly N.; Beizer, Viktor N.; Tokar, Grigory A.; Plastovets, Ivan K.; Barylo, Ivan I.; Koval, Boris A.; Chepurnykh, Sergei F.; Chumachenko, Petr N.; Simonov, Nikolai F.; Kharkhardin, Petr P.; and Litmanovich, Ilya M., 4,231,860, Cl. 209-169.000.

BASF Aktiengesellschaft: *See*—
Boehlke, Klaus; and Kempter, Fritz E., 4,231,854, Cl. 204-294.000.
Dehnert, Johannes; and Juenemann, Werner, 4,231,746, Cl. 8-680.000.
Hagen, Helmut; and Kohler, Rolf-Dieter, 4,232,165, Cl. 548-339.000.

BASF Wyandotte Corporation: *See*—
Cenker, Moses; and Narayan, Thirumurti L., 4,232,127, Cl. 521-106.000.

Bassignani, Luciano: *See*—
Re, Luciano; Brandt, Alberto; and Bassignani, Luciano, 4,232,169, Cl. 560-174.000.

Bastian, Lloyd E.: *See*—
Shaw, Anthony R.; Krueger, Wallace F.; and Bastian, Lloyd E., 4,231,505, Cl. 228-14.000.

Battelle Memorial Institute: *See*—
Trojer, Felix; and Briggs, John, 4,231,776, Cl. 65-33.000.

Battista, Orlando A. Dental floss and dental aid holder. 4,231,381, Cl. 132-89.000.

Bauer, Peter. Fluidic oscillator with resonant inertance and dynamic compliance circuit. 4,231,519, Cl. 239-102.000.

Bausch & Lomb Incorporated: *See*—
Peck, Theodore H., 4,231,638, Cl. 350-255.000.

Baxter Associates, Inc.: *See*—
Baxter, Kenneth W., 4,231,175, Cl. 40-374.000.

Baxter, Kenneth W., to Baxter Associates, Inc. Variable-visibility filing system. 4,231,175, Cl. 40-374.000.

Baxter, Samuel; and Cuangani, Pushpkumar D., to Monsanto Chemicals Limited. Filter elements. 4,232,130, Cl. 521-143.000.

Bayer Aktiengesellschaft: *See*—
Grigo, Ulrich; Merten, Josef; and Binsack, Rudolf, 4,232,132, Cl. 525-222.000.
Hugl, Herbert; and Wolfrum, Gerhard, 4,231,748, Cl. 8-668.000.
Knofel, Hartmut; and Konig, Klaus, 4,231,952, Cl. 260-453.00P.
Kramer, Wolfgang; Buchel, Karl H.; Pflugbeil, Wolf-Dietrich; Frohberger, Paul-Ernst; and Brandes, Wilhelm, 4,232,033, Cl. 424-269.000.
Schmidt, Manfred; Bandtel, Eberhard; Traudisch, Walter; Spott, Georg; and Freitag, Dieter, 4,232,134, Cl. 525-506.000.

Baysinger, Robert L.: *See*—
Newport, Harry E., Jr.; and Baysinger, Robert L., 4,231,732, Cl. 431-46.000.

BBC Brown, Boveri & Company, Limited: *See*—
Faust, Werner; and Etter, Peter, 4,232,235, Cl. 307-252.00R.
Neidig, Arno; Popp, Gerhard; and Gilbers, Gabriele, 4,232,326, Cl. 357-23.000.

Beard, John M., to A & C Boehmer Limited. Light bulb container. 4,231,510, Cl. 229-39.00B.

Bechara, Ibrahim S.; Mascioli, Rocco L.; and Zaluska, Philip J., to Air Products and Chemicals, Inc. Amine salts of tertiary amino acids. 4,232,152, Cl. 544-119.000.

Becher, Manfred; and Sehring, Richard, to Celamerck GmbH & Co. KG. Process for the preparation of 3,6-dichloro-salicyclic. 4,232,172, Cl. 562-423.000.

Becker, Friedbert; Biethan, Gunter; and Kloeber, Peter, to Siemens Aktiengesellschaft. Duplex microwave radio communication system. 4,232,318, Cl. 370-29.000.

Becker, Michael. Device for intramuscular injections, especially of insulin. 4,231,368, Cl. 128-218.00A.

Beckert, Werner F.; Barber, William H.; and Dengel, Ottmar H., to United States of America, Navy. Solid compositions for generation of gases containing a high percentage of hydrogen or its isotopes. 4,231,891, Cl. 252-188.000.

Beckman Instruments, Inc.: *See*—
Chapman, Robert L.; and Harman, John N., III, 4,231,256, Cl. 73-421.50R.

Becton, Dickinson & Company: *See*—
Walsh, J. William; and Bietry, Raymond E., Jr., 4,231,661, Cl. 356-340.000.

Bedford, Alda V., to RCA Corporation. Method of and means for generating complex electrical coding waves for secret communications. 4,232,186, Cl. 178-22.000.

Beecham Group Limited: *See*—
Howarth, Thomas T., 4,232,005, Cl. 424-114.000.
Ponsford, Roger J., 4,232,022, Cl. 424-251.000.

Beerens, Hugo, to Schloemann-Siemag Aktiengesellschaft. Cooling strand for cooling small-section steel. 4,231,382, Cl. 134-64.00R.

Beerens, Hugo; Feldmann, Hugo; and Schlanzke, Claus G., to Schloemann-Siemag Aktiengesellschaft. Apparatus for cooling rapidly moving rolled material. 4,231,553, Cl. 266-113.000.

Beex, Aloysius A., to Starkey Labs, Inc. Moving-average notch filter. 4,232,192, Cl. 179-1.0FS.

Behrendt, Wolfgang; Bohnhage, Detlef; Friedemann, Peter; Frolich, Bernhard; and Orzessek, Reinhold, to Olympia Werke AG. Typewriter ribbon feed mechanism. 4,231,667, Cl. 400-208.000.

Behrens, Dieter: *See*—
Hahn, Reinhard; and Behrens, Dieter, 4,231,790, Cl. 75-0.5BB.

Beier, Alfred: *See*—
Buchholz, Peter; Warnecke, Rolf; and Beier, Alfred, 4,231,727, Cl. 418-76.000.

Beisch, Hans R.; and Hempelmann, Heinrich J., to Norris Industries, Inc. Wheel trim retention means. 4,231,619, Cl. 301-37.00P.

Beizer, Viktor N.: *See*—
Kuznetsov, Vyacheslav D.; Preobrazhensky, Boris P.; Rozhnov, Valentin E.; Stepanov, Jury V.; Belitsky, Anatoly N.; Beizer, Viktor N.; Tokar, Grigory A.; Plastovets, Ivan K.; Barylo, Ivan I.; Koval, Boris A.; Chepurnykh, Sergei F.; Chumachenko, Petr N.; Simonov, Nikolai F.; Kharkhardin, Petr P.; and Litmanovich, Ilya M., 4,231,860, Cl. 209-169.000.

Belfiore, Flavio. Alignment tool. 4,231,161, Cl. 33-181.00R.

Belitsky, Anatoly N.: *See*—
Kuznetsov, Vyacheslav D.; Preobrazhensky, Boris P.; Rozhnov, Valentin E.; Stepanov, Jury V.; Belitsky, Anatoly N.; Beizer, Viktor N.; Tokar, Grigory A.; Plastovets, Ivan K.; Barylo, Ivan I.; Koval, Boris A.; Chepurnykh, Sergei F.; Chumachenko, Petr N.; Simonov, Nikolai F.; Kharkhardin, Petr P.; and Litmanovich, Ilya M., 4,231,860, Cl. 209-169.000.

Bell Telephone Laboratories, Incorporated: *See*—
Acampora, Anthony; and Langseth, Rollin E., 4,232,197, Cl. 370-97.000.
Acampora, Anthony, 4,232,266, Cl. 370-79.000.
Alsberg, Dietrich A., 4,232,249, Cl. 315-3.600.
Faust, Carl W., 4,232,184, Cl. 174-92.000.
Hartman, Adrian R.; Riley, Terence J.; and Shackle, Peter W., 4,232,328, Cl. 357-49.000.
Heiter, George L., 4,232,399, Cl. 455-276.000.
Netravali, Arun N.; and Robbins, John D., 4,232,338, Cl. 358-136.000.
Ohm, Edward A., 4,232,321, Cl. 343-778.000.
Schmidt, Paul F., 4,231,809, Cl. 148-1.500.
Taylor, Gary N., 4,232,110, Cl. 430-313.000.

Bell, Vincent G., Jr.; Burke, Thomas P.; Margolin, George D.; and Vurpillat, Victor V., to Centurion Data Corporation. Check with electrically conductive layer. 4,231,593, Cl. 283-6.000.

Belly, Robert T.: *See*—
Gilman, Paul B., Jr.; Belly, Robert T.; Koszelak, Thaddeus D.; and Zigman, Seymour, 4,232,121, Cl. 435-32.000.

Beloit Corporation: *See*—
Crouse, Jere W., 4,231,272, Cl. 83-98.000.
Goddard, Denis A., 4,232,092, Cl. 428-542.000.

Bendell, Abraham D. Foldable cushioning and support. 4,231,127, Cl. 5-462.000.

Bender, Reinhold H. W., to American Home Products Corporation. Dane salt and process for preparing aminopenicillins therefrom. 4,231,954, Cl. 260-465.00D.

Benedict, Neil W., to Ajax Tool Works, Inc. Pneumatic hammer with twist retainer. 4,231,581, Cl. 279-19.400.

Benson, Jack H.: *See*—
Gibbs, Dale S.; Benson, Jack H.; and Fernandez, Reet T., 4,232,129, Cl. 521-137.000.

Bentley, John; and Thompson, Morice W., to Imperial Chemical Industries Limited. Coating compositions. 4,232,135, Cl. 525-509.000.

Berbeco, George R., to Charleswater Products, Inc. Electrically conductive foam and method of preparation and use. 4,231,901, Cl. 252-511.000.

Berent, John G., to Colt Industries Operating Corp. Positive and negative acceleration responsive means and system. 4,232,372, Cl. 364-566.000.

Berg, Alexander: *See*—
Braeumer, Klaus; Eckmayer, Zdenek; Berg, Alexander; Monsheimer, Rolf; and Pfleiderer, Ernst, 4,232,123, Cl. 435-69.000.

Berg, Charles A., to Owens-Illinois, Inc. Solar powered heat pump construction. 4,231,772, Cl. 62-2.000.

Bergen Expo Systems, Inc.: *See*—
Demick, Eugene; and Van Haasteren, Adrian J., Jr., 4,231,643, Cl. 353-86.000.

Bergles, Eduard, to Fichtel & Sachs AG. Derailleur mechanism. 4,231,264, Cl. 474-80.000.

Bergwerksverband GmbH: *See*—
Romey, Ingo; and Kokot, Hellmut, 4,231,856, Cl. 208-39.000.

Berkey-Colortran, Inc.: *See*—
Leon, Gordon T.; and Byron, Joseph L., 4,232,359, Cl. 362-268.000.

Bernacchia, George, Jr., to National Custom Van Corp. Method of converting a van-type vehicle to a multi-passenger commercial transportation vehicle. 4,231,144, Cl. 29-401.100.

Bernacki, Stephen E.: *See*—
Raffel, Jack I.; and Bernacki, Stephen E., 4,231,819, Cl. 148-175.000.

Bernier, Raymond, to International Detection Protection. Electronic lock, the code of which can easily be modified by the user. 4,232,291, Cl. 340-147.0MD.

Bernstein, Seymour: *See*—
Nair, Vijay G.; Joseph, Joseph P.; and Bernstein, Seymour, 4,232,150, Cl. 536-119.000.
Siuta, Gerald J.; Conrow, Ransom B.; Poletto, John F.; and Bernstein, Seymour, 4,231,958, Cl. 260-507.00R.

Berriman, Lester P.: *See*—
Eversole, James F.; and Berriman, Lester P., 4,231,383, Cl. 137-1.000.

Berringer, Robert T.: *See*—
Myron, Donald L.; and Berringer, Robert T., 4,231,843, Cl. 176-50.000.

Betz Laboratories, Inc.: *See*—
Lavin, Walter M.; McFarlane, James I.; and Rose, Dennis L., 4,231,894, Cl. 252-389.00A.

Bevolo, Albert J.: *See*—
Shanks, Howard R.; Bevolo, Albert J.; Danielson, Gordon C.; and Weber, Michael F., 4,232,097, Cl. 429-44.000.

Bibbero, Robert J., to Honeywell Inc. Adaptive sampled-data controller. 4,232,364, Cl. 364-105.000.

Bichsel, Heinz: *See*—
Pirner, Miroslav; Zoller, Heinrich; and Bichsel, Heinz, 4,232,095, Cl. 428-654.000.

Bickford, John H.; and Snyder, Robert F., to Raymond Engineering Inc. Torque wrench with clutches in series. 4,231,454, Cl. 192-4.00R.

Biethan, Gunter: *See*—
Becker, Friedbert; Biethan, Gunter; and Kloeber, Peter, 4,232,318, Cl. 370-29.000.

Bietry, Raymond E., Jr.: *See*—
Walsh, J. William; and Bietry, Raymond E., Jr., 4,231,661, Cl. 356-340.000.

Billottet, Henri: *See*—
Narbaits-Jaureguy, Jean-Raymond; Billottet, Henri; and Granier, Pierre, 4,232,285, Cl. 340-38.00L.

Binsack, Rudolf: *See*—
Grigo, Ulrich; Merten, Josef; and Binsack, Rudolf, 4,232,132, Cl. 525-222.000.

Bird, Martin J., to Persons-Majestic Manufacturing Company. Cycle seat and clamp therefor. 4,231,611, Cl. 297-195.000.

Birkeholm, Mogens. Apparatus for braking a train of vehicles. 4,231,442, Cl. 180-14.00R.

Birt, David E., to E M I Limited. Moulding video discs. 4,231,730, Cl. 425-385.000.

Bischoff, Klaus; and Stratton, Richard W., to Gesellschaft zur Forderung der Forschung an der Eidgenossischen Technischen Hochschule. Process for the production of ceramic plutonium-uranium nuclear fuel in the form of sintered pellets. 4,231,976, Cl. 264-0.500.

Blachly, Donald L.; and Terpstra, Daniel A., to Emerson Electric Co. Portable work bench. 4,231,557, Cl. 269-139.000.

Black Clawson Company, The: *See*—
Zink, Stanley C., 4,231,318, Cl. 118-122.000.

Black, Donald L. Automatic fish snatcher. 4,231,178, Cl. 43-16.000.

Blake, Jon R., to General Mills, Inc. Citrus juice vesicle containing frosting compositions and method of preparation. 4,232,049, Cl. 426-572.000.

Blake, Jon R., to General Mills, Inc. Cooked comestible base containing citrus juice vesicles and method of preparation. 4,232,053, Cl. 426-616.000.

Bland, Gerald F.; and Payne, Guy D., to Outboard Marine Corporation. Actuation means for marine propulsion device transmission. 4,231,316, Cl. 440-86.000.

Blanpain, Guy; and Grandfils, Pierre, to Charbonnages de France. Heavy duty adjustable prop with a ball-and-socket joint. 4,231,672, Cl. 403-62.000.

Blechschmidt, James L.: *See*—
Ekonen, Martin A.; and Blechschmidt, James L., 4,231,554, Cl. 267-65.00D.

Bleys, Cyriacus A.: *See*—
Haski, Andre L.; and Bleys, Cyriacus A., 4,231,255, Cl. 73-379.000.

Bloom, Stanley M.; Borror, Alan L.; and Foley, James W., to Polaroid Corporation. Sulfam(na)phthaleins. 4,231,929, Cl. 260-243.300.

Boatwright, John T.; Prince, David G.; Haskett, William F.; and Koch, Helmut, to Summa Four, Inc. Special services add-on for dial pulse activated telephone switching office. 4,232,199, Cl. 179-18.00B.

Bobrowski, Louis G.: *See*—
Amtmann, James S.; and Bobrowski, Louis G., 4,231,626, Cl. 312-350.000.

Bochan, John, to General Electric Company. Washing machine with delayed action drive clutch. 4,231,237, Cl. 68-23.700.

Bock, Erik, to Superfos Emballage. Container seal and closure. 4,231,486, Cl. 220-266.000.

Boehlke, Klaus; and Kempter, Fritz E., to BASF Aktiengesellschaft. Anode for cathodic electrocoating. 4,231,854, Cl. 204-294.000.

Boehringer, John R.; and Lecky, John H. Pulmonary exerciser. 4,231,375, Cl. 128-725.000.

Boehringer Mannheim GmbH: *See*—
Winter, Werner; Hindermayr, Herman; Roesch, Egon; Roesch, Androniki; and Wilhelms, Otto-Henning, 4,232,024, Cl. 424-251.000.

Boeing Commercial Airplane Company: *See*—
Nash, Gilbert J.; and Seidel, Gerhard E., 4,231,481, Cl. 220-1.500.

Boeing Company, The: *See*—
Dickey, Fred M.; White, Jerry R.; and Crill, James, 4,231,656, Cl. 355-71.000.
Ishimitsu, Kichio K.; and Tinoco, Edward N., 4,231,536, Cl. 244-135.00A.
Johnson, Roger F.; and Mitzel, Allen M., 4,231,160, Cl. 33-174.00P.
Painter, Mark C., 4,231,616, Cl. 297-481.000.

Bogan, David B. Underground storage vault. 4,231,482, Cl. 220-5.00A.

Boger, Manfred; Drabek, Jozef; Mattern, Gunter; and Traber, Walter, to Ciba-Geigy Corporation. 1-Phosphorylated 2-(phenoxyalkyl)-2-imidazoline derivatives and their use in pest control. 4,232,011, Cl. 424-200.000.

Bohlin, Nils I., to AB Volvo. Side collision protection system for motor vehicles. 4,231,607, Cl. 296-63.000.

Bohnhage, Detlef: *See*—
Behrendt, Wolfgang; Bohnhage, Detlef; Friedemann, Peter; Frolich, Bernhard; and Orzessek, Reinhold, 4,231,667, Cl. 400-208.000.

Boll, Richard H., deceased (by United National Bank & Trust Co., executor); and Ghering, Walter L., to Babcock & Wilcox Company, The. System for measuring entrained solid flow. 4,231,262, Cl. 73-861.040.

Bollinger, Frederic G., to Monsanto Company. Substituted 2-imino-1,3-dithio and 1,3-oxathio heterocyclic compounds as herbicidal antidotes. 4,231,783, Cl. 71-90.000.

Bondarenko, Alexandr S.: *See*—
Zverev, Anatoly I.; and Bondarenko, Alexandr S., 4,231,518, Cl. 239-81.000.

Boone, David E., to Standard Oil Company (Indiana). Olefin polymerization catalyst. 4,232,138, Cl. 526-122.000.

Bordini, Fosco; and Mauri, Luigi, to Moplefan S.p.A. Polyolefin films with a high resistance to sticking against welding bars having a top coating comprising a combination of an epoxy resin, an acrylic resin and nitrocellulose. 4,232,089, Cl. 428-413.000.

Borg-Warner Corporation: *See*—
Gopalakrishnan, Sankaraiyer; and Kuivinen, William L., 4,231,702, Cl. 415-56.000.
Hallberg, Irving H.; Paul, Howard C.; Ralston, Ronald R.; and Hunninghaus, Roy E., 4,231,335, Cl. 123-440.000.

Born, Billy L.: *See*—
Hinds, Horace, Jr.; Heimerman, David P.; and Born, Billy L., 4,232,051, Cl. 426-582.000.

Born, Thorwald; and Bruning, Karl-Heinz. Polyurethane-based binder system for the production of casting molds or cores. 4,231,914, Cl. 260-31.80N.

Borror, Alan L.: *See*—
Bloom, Stanley M.; Borror, Alan L.; and Foley, James W., 4,231,929, Cl. 260-243.300.

Botzenhardt, Helmut: *See*—
Kern, Horstmar; and Botzenhardt, Helmut, 4,231,207, Cl. 52-730.000.

Boucraut, Frantz M., to Valton S.A. Device for gripping and displacing knitted or woven articles. 4,231,563, Cl. 271-18.300.

Boudreault, Jean-Pierre, to Gaylord Regethermic Canada Ltd. Container. 4,231,490, Cl. 220-354.000.

Bounds, William E. Catcher device for condiment mill. 4,231,527, Cl. 241-169.100.

Bourbon, Jean. Pouring spout with pivoted nonuse position. 4,231,497, Cl. 222-527.000.

Bourgeois, Ronald D. Self-timing automatic conveyor system. 4,231,465, Cl. 198-460.000.

Bovier, Edward M.; and Carter, James A., to Anheuser-Busch Incorporated. Starch adhesive composition containing an oxidized waxy starch ester. 4,231,803, Cl. 106-213.000.

Bowden, Donald R.; and Sparks, Robert O., to Solar Unlimited, Inc. Interface circuit for adding solar heat to a building heating and cooling system. 4,231,352, Cl. 126-422.000.

Boyle, Francis T.; and Davies, Alan, to Imperial Chemical Industries Limited. Methods, compositions and chemical compounds for use in animal husbandry. 4,232,032, Cl. 424-269.000.

Brabetz, Bernhard; and Hackl, Helmut, to Siemens Aktiengesellschaft. Drill comprised of hard metal for drilling contact holes in circuit boards and the like. 4,231,692, Cl. 408-230.000.

Bradshaw, Michael; and Edwards, Roger D., to Leeds and Northrup Ltd. Thermal printing device with spring support tines. 4,232,325, Cl. 346-76.00R.

Braeumer, Klaus; Eckmayer, Zdenek; Berg, Alexander; Monsheimer, Rolf; and Pfleiderer, Ernst, to Carl Freudenberg, Firma; and R/m

GmbH. Method for making water-soluble hydrolyzates of keratinaceous materials. 4,232,123, Cl. 435-69.000.
Brandes, Gunter; Wollner, Johannes; Neier, Wilhelm; and Webers, Werner, to Deutsche Texaco Aktiengesellschaft. Method of conducting reactions in a trickel-type reactor. 4,231,966, Cl. 568-396.000.
Brandes, Wilhelm: *See—*
Kramer, Wolfgang; Buchel, Karl H.; Pflugbeil, Wolf-Dietrich; Frohberger, Paul-Ernst; and Brandes, Wilhelm, 4,232,033, Cl. 424-269.000.
Brandt, Alberto: *See—*
Re, Luciano; Brandt, Alberto; and Bassignani, Luciano, 4,232,169, Cl. 560-174.000.
Brandt, Lennart H.; and Mansson, Staffan T., to AB Volvo Penta. Boat propeller device. 4,231,317, Cl. 440-50.000.
Brauer, Melvin; and Kroplinski, Thaddeus F., to NL Industries, Inc. Grease compatible mineral oil extended polyurethane. 4,231,986, Cl. 264-272.000.
Braukmann Armaturen AG: *See—*
Braukmann, Heinz W., 4,231,386, Cl. 137-117.000.
Braukmann, Heinz W., 4,231,548, Cl. 251-282.000.
Braukmann, Heinz W., to Braukmann Armaturen AG. Differential pressure relief valve. 4,231,386, Cl. 137-117.000.
Braukmann, Heinz W., to Braukmann Armaturen AG. Balance valve disc and seat structure. 4,231,548, Cl. 251-282.000.
Braun, Walter; Burst, Hermann; and Peter, Dietmar, to Dr. Ing. h.c.F. Porsche Aktiengesellschaft. Automobile bumper. 4,231,600, Cl. 293-128.000.
Breiter, Manfred W.: *See—*
Park, Dong-Sil; Chatterji, Debajyoti; and Breiter, Manfred W., 4,232,098, Cl. 429-104.000.
Brenner, Daniel G.: *See—*
Shepard, Kenneth L.; and Brenner, Daniel G., 4,232,158, Cl. 546-72.000.
Bretzger, Graham. Assembly for and method of making mold and casting of one-piece impellers. 4,231,413, Cl. 164-15.000.
Bridge, John F.: *See—*
Hart, Milburn L.; and Bridge, John F., 4,231,823, Cl. 156-64.000.
Bridges, Wilbur L.: *See—*
Sullivan, Daniel S., III; and Bridges, Wilbur L., 4,231,956, Cl. 260-465.80R.
Briggs, John: *See—*
Trojer, Felix; and Briggs, John, 4,231,776, Cl. 65-33.000.
Bristol-Myers Company: *See—*
Naito, Takayuki; Okumura, Jun; and Kamachi, Hajime, 4,231,928, Cl. 260-239.100.
Naito, Takayuki; Nakagawa, Susumu; Yamasaki, Tetsuro; Okita, Taka-Aki; and Yamashita, Haruhiro, 4,232,155, Cl. 544-277.000.
Broccali, Giampietro: *See—*
Monguzzi, Riccardo; Pifferi, Giorgio; Pinza, Mario; and Broccali, Giampietro, 4,231,927, Cl. 260-239.100.
Brooks, Forrest E., to Telex Computer Products, Inc. Method of tuning a flyback transformer for minimum ringing. 4,231,150, Cl. 29-593.000.
Browne, Lawrence T. Article placement system. 4,231,153, Cl. 29-739.000.
Bruckner Apparatebau GmbH: *See—*
Gresens, Harry; and Schuierer, Manfred, 4,231,165, Cl. 34-28.000.
Bruning, Karl-Heinz: *See—*
Born, Thorwald; and Bruning, Karl-Heinz, 4,231,914, Cl. 260-31.80N.
Buchel, Karl H.: *See—*
Kramer, Wolfgang; Buchel, Karl H.; Pflugbeil, Wolf-Dietrich; Frohberger, Paul-Ernst; and Brandes, Wilhelm, 4,232,033, Cl. 424-269.000.
Buchholz, Peter; Warnecke, Rolf; and Beier, Alfred, to Volkswagenwerk Aktiengesellschaft. Vacuum producing rotary vane pump with shaft lubrication. 4,231,727, Cl. 418-76.000.
Buck, Gerold A.: *See—*
Schreck, Philipp; and Buck, Gerold A., 4,231,977, Cl. 264-33.000.
Buckwalter, Mervin R.; Bulson, Walter T.; and Ray, Leonard N., Jr., to Armstrong Cork Company. Process for shading during the vapor phase dyeing of carpet. 4,231,743, Cl. 8-471.000.
Budzich, Tadeusz. Load responsive fluid control valves. 4,231,396, Cl. 137-596.130.
Buehler-Miag GmbH: *See—*
Muller, Dieter, 4,231,991, Cl. 422-245.000.
Buerkley, Donald D.; Sweeny, Norman P.; and Vivona, Daniel N., to Minnesota Mining and Manufacturing Company. Imaging compositions and methods. 4,232,083, Cl. 428-307.000.
Buhler, Ernst, to A.G. fur industrielle Elecktronik AGIE Losone b. Locarno. Apparatus and method for electrical discharge machining. 4,232,208, Cl. 219-69.00W.
Bulson, Walter T.: *See—*
Buckwalter, Mervin R.; Bulson, Walter T.; and Ray, Leonard N., Jr., 4,231,743, Cl. 8-471.000.
Bunting, James R.: *See—*
Dowben, Robert M.; and Bunting, James R., 4,231,750, Cl. 23-230.00B.
Burckhardt, Dieter, to Zahnradfabrik Friedrichshafen AG. Flow divider valve assembly. 4,231,441, Cl. 180-6.480.
Burk, George A.; Reineke, Charles E.; and Wilson, Charles A., to Dow Chemical Company, The. Aqueous antimicrobial composition having improved stability. 4,232,041, Cl. 424-304.000.
Burke, James W.; and Cook, John N., to Kru-Bur, Inc. Cannister mounting bracket. 4,231,391, Cl. 137-343.000.
Burke, Robert G.; and Martin, Robert F., to Control Data Corporation. Method and apparatus for rotating priorities between stations sharing a communication channel. 4,232,294, Cl. 340-147.0LP.
Burke, Thomas P.: *See—*
Bell, Vincent G., Jr.; Burke, Thomas P.; Margolin, George D.; and Vurpillat, Victor V., 4,231,593, Cl. 283-6.000.
Burns, David C., to Westinghouse Electric Corp. Tube lock drill tool. 4,231,690, Cl. 408-80.000.
Burns, Richard W. Torch igniter. 4,231,734, Cl. 431-274.000.
Burroughs Corporation: *See—*
Juziuk, Jurgen A.; Mack, Ronald H.; Banka, Eugene F.; and Nicol, Edward A., 4,232,217, Cl. 235-480.000.
Saunders, Michael A.; and Irwin, Robert W., 4,232,356, Cl. 361-415.000.
Burroughs Wellcome Co.: *See—*
Miller, Richard J.; Chang, Kwen-Jen; and Cuatrecasas, Pedro, 4,231,923, Cl. 260-112.50R.
Burst, Hermann: *See—*
Braun, Walter; Burst, Hermann; and Peter, Dietmar, 4,231,600, Cl. 293-128.000.
Burth, Rolf-Dieter: *See—*
Gerlach, Albrecht; Holzmann, Dieter; Lindstedt, Guenter; and Burth, Rolf-Dieter, 4,232,297, Cl. 340-168.00S.
Burzio, Fulvio: *See—*
Calmanti, Giulio; Gafa, Salvatore; Dadea, Giovanni M.; Gatti, Alfonso; and Burzio, Fulvio, 4,231,841, Cl. 162-5.000.
Buske, Gary R., to Dow Chemical Company, The. Aminoalkylation of aromatic polymers using aldehyde, diacylamine and strong acid catalyst. 4,232,125, Cl. 521-32.000.
Buss, Dennis D.: *See—*
Chapman, Richard A.; Buss, Dennis D.; and Kinch, Michael A., 4,231,149, Cl. 29-578.000.
Butler, James K. Microtomy knife breaker. 4,231,503, Cl. 225-2.000.
Button, Peter A. Range finder. 4,231,162, Cl. 33-284.000.
B.V. Neratoom: *See—*
Versluis, Ronald, 4,231,395, Cl. 137-514.700.
Byfuglien, Arne, to A/S Raufoss Ammunisjonsfabrikker. Arrangement in or relating to a valve. 4,231,393, Cl. 137-491.000.
Byron, Joseph L.: *See—*
Leon, Gordon T.; and Byron, Joseph L., 4,232,359, Cl. 362-268.000.
Byun, Dong J. Automatic soda-acid fire extinguisher system. 4,231,430, Cl. 169-57.000.
C M Industries: *See—*
Lombard, Jean-Pierre, 4,232,020, Cl. 424-248.560.
C. R. Bard, Inc.: *See—*
Young, Joe W.; and Odenthal, Charles, 4,231,973, Cl. 261-78.00A.
Cahoy, Roger P., to Gulf Oil Corporation. 2-Acylaminothiazol-4-ylacetamides as post emergent selective herbicides. 4,232,163, Cl. 548-195.000.
Calmanti, Giulio; Gafa, Salvatore; Dadea, Giovanni M.; Gatti, Alfonso; and Burzio, Fulvio, to Montedison S.p.A. Process for the de-inking of printed waste paper. 4,231,841, Cl. 162-5.000.
Campanella, Matthew J.; Maladra, Anthony; and Goldberg, Bennett C., to MKD Corporation. Waiter/table control for electronic cash registers. 4,231,511, Cl. 235-375.000.
Campanini, Sergio, to Echlin Manufacturing Company, The. Brake actuators. 4,231,286, Cl. 92-64.000.
Campbell, Alexander C.; Hewett, Colin L.; and Zeelen, Filippus J., to Akzona Incorporated. Di-Carboxylic acid derivatives. 4,232,042, Cl. 424-308.000.
Campbell, Ivor E.; Henderson, James M.; Johnson, Walter; and Wetherill, William H., to Smelter Control Research Association, Inc. Ammonia double-alkali process for removing sulfur oxides from stack gases. 4,231,995, Cl. 423-242.000.
Campbell, James D.: *See—*
Lintell, Robert J.; and Campbell, James D., 4,231,534, Cl. 244-3.160.
Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See—*
Hara, Elmer H.; and Ozeki, Takeshi, 4,232,385, Cl. 370-3.000.
Canadian Industries Limited: *See—*
Istvanffy, Stephen M.; and Linse, Vonne D., 4,231,506, Cl. 228-109.000.
Canino, Lawrence S., to MCA Discovision, Inc. Dithered center tracking system. 4,232,201, Cl. 179-100.10G.
Canon Kabushiki Kaisha: *See—*
Ichikawa, Junji; Takahashi, Yuji; and Saito, Jun, 4,231,565, Cl. 271-105.000.
Caplan, Sidney W.; and Molson, William N., to Component Systems, Inc. Building system employing prefabricated wall panels. 4,231,197, Cl. 52-36.000.
Carabateas, Philip M.: *See—*
Diana, Guy D.; and Carabateas, Philip M., 4,232,161, Cl. 546-279.000.
Carbonari, Jean P.: *See—*
Augier, Robert; Carbonari, Jean P.; and Eliche, Jean, 4,231,198, Cl. 52-91.000.
Carciello, Neal: *See—*
Zeldin, Arkady; Carciello, Neal; Kukacka, Lawrence; and Fontana, Jack, 4,231,917, Cl. 260-37.0SB.
Carey, David L.: *See—*
Riley, Robert Q.; and Carey, David L., 4,231,568, Cl. 272-136.000.
Carl Freudenberg, Firma: *See—*
Braeumer, Klaus; Eckmayer, Zdenek; Berg, Alexander; Monsheimer, Rolf; and Pfleiderer, Ernst, 4,232,123, Cl. 435-69.000.

Carl Still GmbH & Co. KG, Firma: *See*—
Weber, Heinrich; Lorenz, Kurt; Dungs, Horst; Kurtz, Roman; and Kersting, Hans-Joachim, 4,231,844, Cl. 201-34.000.

Carlberg, Bob L.; and Hart, Robert A., to Conoco, Inc. Permanent cobalt catalyst for sulfite oxygen scavenging. 4,231,869, Cl. 210-763.000.

Carlen, Eric T. Delivery control system for vehicle-mounted spreader. 4,232,255, Cl. 318-143.000.

Carlin, William W., to PPG Industries, Inc. Method of preparing a cathode electrocatalyst. 4,231,813, Cl. 148-6.300.

Carlson, Robert C., to Minnesota Mining and Manufacturing Company. Ester solutions of complex salts. 4,231,886, Cl. 252-117.000.

Carlsson, Jan P. E.; Axen, Rolf E. A. V.; and Drevin, Hakan N. Y., to Pharmacia Diagnostics AB. Method in assaying methods involving biospecific affinity reactions and reagent for use in said method. 4,231,999, Cl. 424-1.000.

Carlsson, Jan P. E.; Axen, Rolf E. A. V.; and Drevin, Hakan N. Y., to Pharmacia Diagnostics AB. Reagent for use in immunochemical assay methods. 4,232,119, Cl. 435-7.000.

Carlsson, Per-Olov A. V.; and Stenberg, Kaj O., to Gambro AB. Diffusion apparatus utilizing tubular semi-permeable membrane. 4,231,875, Cl. 210-232.000.

Carlsson, Per-Olov A. V.; and Stenberg, Kaj O., to Gambro AB. Assembly for the closure of the end of a flattened tube. 4,231,880, Cl. 210-321.00B.

Carlstrom, William L.; and Maechtle, Gary L., to Freeman Chemical Corporation. Flexible polyurethane foam having a low flame spread index. 4,232,085, Cl. 428-315.000.

Caron, Roger L.; Clifford, Peter J.; and Germain, Francis R., to EG & G, Inc. Underwater mapping apparatus and method. 4,232,380, Cl. 367-88.000.

Carpigiani Bruto Macchine Automatiche S.p.A.: *See*—
Manfroni, Ezio, 4,231,547, Cl. 251-210.000.

Carrier Corporation: *See*—
Eaton, Burrows P.; and Wright, William, 4,231,421, Cl. 165-68.000.
Galvin, Michael E.; and Whitwell, Robert J., 4,231,228, Cl. 62-77.000.
Gratzer, Nelson R.; and Wright, William E., 4,231,230, Cl. 62-503.000.
Ripka, Chester D., 4,231,417, Cl. 165-3.000.

Carstens, Marion R., to Georgia Tech Research Institute. Air-actuated pipeline transportation system with wheeled vehicles. 4,231,689, Cl. 406-155.000.

Carter, James A.: *See*—
Bovier, Edward M.; and Carter, James A., 4,231,803, Cl. 106-213.000.

Carter, Neil A., to Owens-Corning Fiberglas Corporation. Method of making jacketed foam pipe insulation. 4,231,825, Cl. 156-78.000.

Carter, Walter H.; and Sides, Jerry L., to Texaco Inc. Method of using tracer fluids for enhanced oil recovery. 4,231,426, Cl. 166-252.000.

Carternock, Frederick A., to Integrated Technology Limited. Paving machines. 4,231,678, Cl. 404-103.000.

Casabona, Richard J.: *See*—
Levy, John V.; Rodgers, David P.; Stewart, Robert E.; and Casabona, Richard J., 4,232,366, Cl. 364-200.000.

Cascade Steel Rolling Mills, Inc.: *See*—
Stevens, Joel B.; and Wirfs, Mark C., 4,232,066, Cl. 427-430.100.

Cash, Theodore P.: *See*—
Holt, John P.; and Cash, Theodore P., 4,231,800, Cl. 106-58.000.

Casma Di V. Marinoni & Figli: *See*—
Schoker, Hans, 4,231,134, Cl. 16-49.000.

Castoe, John H. Jack adapter for front end alignments. 4,231,550, Cl. 254-124.000.

Casutt, Max: *See*—
Heffner, George R.; and Casutt, Max, 4,231,556, Cl. 269-22.000.

Caterpillar Tractor Co.: *See*—
Cobb, Delwin E.; and Young, Maurice E., 4,231,726, Cl. 418-75.000.
Henry, William P., 4,231,806, Cl. 134-18.000.

Cecil, Howard E.: *See*—
Kutik, Louis F.; and Cecil, Howard E., 4,231,493, Cl. 222-321.000.

Celamerck GmbH & Co. KG: *See*—
Becher, Manfred; and Sehring, Richard, 4,232,172, Cl. 562-423.000.

Cenker, Moses; and Narayan, Thirumurti L., to BASF Wyandotte Corporation. Furan-modified isocyanurate foams. 4,232,127, Cl. 521-106.000.

Central Glass Company, Limited: *See*—
Okino, Seiki; Nakata, Kunio; Yanai, Tosiharu; and Kandachi, Takayoshi, 4,232,062, Cl. 427-160.000.

Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie: *See*—
Paulus, Philippe; and Hancart, Jules, 4,231,812, Cl. 148-6.15R.

Centro Ricerche Fiat S.p.A.: *See*—
Mengoli, Giuliano; Daolio, Sergio; Giulio, Ugo; and Folonari, Carlo, 4,231,851, Cl. 204-181.00R.
Urbinati, Mario; and Conti, Luigi, 4,231,344, Cl. 123-518.000.

Centurion Data Corporation: *See*—
Bell, Vincent G., Jr.; Burke, Thomas P.; Margolin, George D.; and Vurpillat, Victor V., 4,231,593, Cl. 283-6.000.

Ceprini, Mario Q.; Collins, John D.; Hoch, Samuel; and Wood, Donald A., to Albright & Wilson Limited. Process for preparing organotin esters. 4,231,949, Cl. 260-429.700.

CF Industries, Inc.: *See*—
Barron, John W.; and Van Moorsel, William H., 4,231,839, Cl. 159-47.0UA.

Chaki, Eiichi; Chiba, Taneaki; and Sato, Tetsuo, to Tokyo Shibaura Denki Kabushiki Kaisha. Aircraft landing-guiding apparatus. 4,232,316, Cl. 343-108.00R.

Challenger, Inc.: *See*—
Ellmore, John W., 4,231,191, Cl. 49-28.000.

Champion International Corporation: *See*—
Austin, John J., 4,231,509, Cl. 229-22.000.

Champion Spark Plug Company: *See*—
Shaffer, Donald O., 4,232,055, Cl. 427-33.000.

Chamuel, Jacques R., to Charles Stark Draper Laboratory, Inc., The. Position determining system. 4,231,260, Cl. 73-597.000.

Chan, Ka-Kong; and Pawson, Beverly A., to Hoffmann-La Roche Inc. Fluorinated polyenes. 4,231,944, Cl. 260-347.400.

Chandon Investment Planning Ltd.: *See*—
Thoma, Hans A., 4,231,989, Cl. 422-63.000.

Chang, Clarence D.; Lang, William H.; and LaPierre, Rene B., to Mobil Oil Corporation. Synthesis of alkyl and alkylaminonitriles. 4,231,955, Cl. 260-465.100.

Chang, Ifay F.; and Shafer, Merrill W., to International Business Machines Corporation. Manganese doped zinc silicate luminescent phosphors with III-V oxide substitutions. 4,231,892, Cl. 252-301.60F.

Chang, Kwen-Jen: *See*—
Miller, Richard J.; Chang, Kwen-Jen; and Cuatrecasas, Pedro, 4,231,923, Cl. 260-112.50R.

Chang, Yu-Wen; and Paul, Jeffrey A., to United States of America, Army. Millimeter wave image guide integrated balanced mixer. 4,232,401, Cl. 455-328.000.

Chapman, John F., to Rolls-Royce Limited. Multi-layer acoustic linings. 4,231,447, Cl. 181-213.000.

Chapman, Richard A.; Buss, Dennis D.; and Kinch, Michael A., to Texas Instruments Incorporated. Narrow band-gap semiconductor CCD imaging device and method of fabrication. 4,231,149, Cl. 29-578.000.

Chapman, Robert L.; and Harman, John N., III, to Beckman Instruments, Inc. Thermoelectric gas dryer. 4,231,256, Cl. 73-421.50R.

Charbonnages de France: *See*—
Blanpain, Guy; and Grandfils, Pierre, 4,231,672, Cl. 403-62.000.

Charles, James A., to Metallurgical Processes Ltd.; and I.S.C. Smelting Ltd. Roasting of sulphide materials. 4,231,791, Cl. 75-9.000.

Chas. M. Bailey Co., Inc.: *See*—
Dixon, Robert W., 4,231,387, Cl. 137-218.000.

Charles Stark Draper Laboratory, Inc., The: *See*—
Chamuel, Jacques R., 4,231,260, Cl. 73-597.000.

Charleswater Products, Inc.: *See*—
Berbeco, George R., 4,231,901, Cl. 252-511.000.

Chatterji, Debajyoti: *See*—
Park, Dong-Sil; Chatterji, Debajyoti; and Breiter, Manfred W., 4,232,098, Cl. 429-104.000.

Chavannes, Marc A. Reinforced paper product and method for the manufacturing thereof. 4,232,074, Cl. 428-110.000.

Cheek, Edward E., to Dravo Corporation. Dry stacker and reclaimer. 4,231,467, Cl. 198-508.000.

Chemical Research & Licensing Company: *See*—
Smith, Lawrence A., Jr., 4,232,177, Cl. 585-324.000.

Chemische Werke Huls Aktiengesellschaft: *See*—
Kaufhold, Manfred; Hepp, Dieter; and Menzel, Gerhard, 4,231,915, Cl. 260-31.80R.
Magiera, Leonhardt; Grundmann, Raban; and Krockenberger, Dieter, 4,231,968, Cl. 570-109.000.

Chemsoil Corporation: *See*—
Collins, Dwight D., 4,231,780, Cl. 71-40.000.

Chen, Nai Y.; Miale, Joseph N.; and Reagan, William J., to Mobil Oil Corporation. Method of producing a steam stable aluminosilicate zeolite catalyst. 4,231,899, Cl. 252-455.00Z.

Cheng, Richard C. M. Track section for model vehicles. 4,231,517, Cl. 238-10.00F.

Cheng, Yao-Hui. Enamelled basin structure. 4,231,123, Cl. 4-651.000.

Chepurnykh, Sergei F.: *See*—
Kuznetsov, Vyacheslav D.; Preobrazhensky, Boris P.; Rozhnov, Valentin E.; Stepanov, Jury V.; Belitsky, Anatoly N.; Beizer, Viktor N.; Tokar, Grigory A.; Plastovets, Ivan K.; Barylo, Ivan I.; Koval, Boris A.; Chepurnykh, Sergei F.; Chumachenko, Petr N.; Simonov, Nikolai F.; Kharkhardin, Petr P.; and Litmanovich, Ilya M., 4,231,860, Cl. 209-169.000.

Cherkson, Leonard A., to Mount Isa Mines Limited. Borehole direction measurement means. 4,231,252, Cl. 73-151.000.

Chevron Research Company: *See*—
Paradis, Stephen G.; Marquis, David M.; and Bakshi, Kiran R., 4,231,943, Cl. 260-346.750.

Chiba, Hideo; Sasaki, Ryuzo; Yoshikawa, Masaaki; Takahashi, Naofumi; Sugimoto, Etsuro; and Samejima, Hirotoshi, to Kyowa Hakko Kogyo Co., Ltd. Enzymatic improvement of protein flavor. 4,232,044, Cl. 426-44.000.

Chiba, Taneaki: *See*—
Chaki, Eiichi; Chiba, Taneaki; and Sato, Tetsuo, 4,232,316, Cl. 343-108.00R.

Chihara, Hiroyuki, to Kabushiki Kaisha Suwa Seikosha. Electronic timepiece battery monitoring circuit. 4,232,383, Cl. 368-66.000.

Chorbov, Iliya G.: *See*—
Nikolov, Ivan D.; Chorbov, Iliya G.; and Peychev, Ivan M., 4,231,416, Cl. 164-318.000.

Christensen, Burton G.; Leanza, William J.; and Wildonger, Kenneth J., to Merck & Co., Inc. Substituted N-methylene derivatives of thienamycin sulfoxide and sulfone. 4,232,030, Cl. 424-263.000.

Christensen, Burton G.; and Shih, David H., to Merck & Co., Inc. 6-, 1- and 2-Substituted-1-carbadethiapen-2-em-3-carboxylic acids. 4,232,036, Cl. 424-274.000.
Christensen, Fredrich M. Apparatus for draining a cooling system. 4,231,384, Cl. 137-62.000.
Christensen, Inc.: *See—*
Swersky, Gerald S.; and Mason, Keith J., 4,231,437, Cl. 175-325.000.
Chrysler Corporation: *See—*
Teague, Kenneth W., 4,231,390, Cl. 137-315.000.
Chuard, Marcel: *See—*
Friedling, Gerard; and Chuard, Marcel, 4,231,400, Cl. 137-798.000.
Chumachenko, Petr N.: *See—*
Kuznetsov, Vyacheslav D.; Preobrazhensky, Boris P.; Rozhnov, Valentin E.; Stepanov, Jury V.; Belitsky, Anatoly N.; Beizer, Viktor N.; Tokar, Grigory A.; Plastovets, Ivan K.; Barylo, Ivan I.; Koval, Boris A.; Chepurnykh, Sergei F.; Chumachenko, Petr N.; Simonov, Nikolai F.; Kharkhardin, Petr P.; and Litmanovich, Ilya M., 4,231,860, Cl. 209-169.000.
Chung, David H.; and Cosley, John V., to Umtech, Inc. Segment ordering for television receiver control unit. 4,232,374, Cl. 364-900.000.
Chyron Corporation: *See—*
Agneta, Roi D., 4,232,311, Cl. 340-703.000.
Ciba-Geigy Corporation: *See—*
Babler, Fridolin, 4,231,918, Cl. 260-40.00P.
Boger, Manfred; Drabek, Jozef; Mattern, Gunter; and Traber, Walter, 4,232,011, Cl. 424-200.000.
Koller, Stefan, 4,231,942, Cl. 260-346.710.
Marky, Michael, 4,231,957, Cl. 260-505.00C.
Model, Ernst, 4,231,931, Cl. 260-325.0PH.
Moser, Paul, 4,231,921, Cl. 260-45.75R.
Reinehr, Dieter; and Gsell, Laurenz, 4,231,962, Cl. 564-272.000.
Rody, Jean; and Rasberger, Michael, 4,232,131, Cl. 525-184.000.
Cities Service Company: *See—*
Ort, Morris R., 4,232,140, Cl. 526-129.000.
Citizen Watch Co., Ltd.: *See—*
Kizaki, Shigeru, 4,232,109, Cl. 430-312.000.
Clark Equipment Company: *See—*
Tapley, David R., 4,232,370, Cl. 364-478.000.
Clark, Grady W.; Holder, John D.; and Pasto, Arvid E., to United States of America, Energy. Internal zone growth method for producing metal oxide metal eutectic composites. 4,231,796, Cl. 75-206.000.
Clausen, Dieter; and Uhlemayr, Albert, to Michael Huber Munchen, GmbH. Manufacture and use of heat transfer printings. 4,231,742, Cl. 8-470.000.
Clifford, Peter J.: *See—*
Caron, Roger L.; Clifford, Peter J.; and Germain, Francis R., 4,232,380, Cl. 367-88.000.
Cline, Warren K.; and Martin, Richard H., to Olin Corporation. Wrapper for smoking articles containing magnesium oxide. 4,231,377, Cl. 131-9.000.
Close, Albert R., to American Safety Equipment Corporation. Automatic retractor inhibitor. 4,231,591, Cl. 280-806.000.
Closse, Annemarie; Haefliger, Walter; and Hauser, Daniel, to Sandoz Ltd. Phenyl- or cycloalkyl-benzo-oxacyclic compounds. 4,232,039, Cl. 424-278.000.
Clouser, David E.; and Engel, Steven J., to Hewlett-Packard Company. Method for extending transistor logarithmic conformance. 4,232,233, Cl. 307-229.000.
Coast Catamaran France S.A.: *See—*
Pelletier, Jean, 4,231,309, Cl. 114-162.000.
Cobb, Delwin E.; and Young, Maurice E., to Caterpillar Tractor Co. Gear pump having fluid deaeration capability. 4,231,726, Cl. 418-75.000.
Cohen, Floraine. Pet accessory for use with a commode. 4,231,321, Cl. 119-1.000.
Cole-Parmer Instrument Company: *See—*
Hogan, Lawrence R., 4,231,725, Cl. 417-477.000.
Coleman, John D., to Commonwealth Scientific and Industrial Research Organization. Reconsolidated wood product. 4,232,067, Cl. 428-17.000.
Coll, Antonio L. P.; and Meseguer, Jose D., to Antibiotics, S.A. P-Substituted N,N'-bis-(3-oxazolidinyl-2-one)phosphoramides and process for the preparation thereof. 4,232,162, Cl. 548-111.000.
Collecchia, Franco: *See—*
Baldi, Luciano; Francese, Renato; and Collecchia, Franco, 4,232,153, Cl. 544-204.000.
Collender, Robert B. Stereoscopic motion picture-circular to linear scan translator-method and apparatus. 4,231,642, Cl. 352-58.000.
Collins, Dwight D., to Chemsoil Corporation. Treatment of phosphate rock on soil in situ with sulfuric acid. 4,231,780, Cl. 71-40.000.
Collins, John D.: *See—*
Ceprini, Mario Q.; Collins, John D.; Hoch, Samuel; and Wood, Donald A., 4,231,949, Cl. 260-429.700.
Coloplast International A/S: *See—*
Sorensen, Erik L.; and Larsen, Hans-Ole, 4,231,369, Cl. 128-283.000.
Colt Industries Operating Corp: *See—*
Berent, John G., 4,232,372, Cl. 364-566.000.
Colwell, William W. Hydraulic pump system. 4,231,714, Cl. 417-229.000.
Comercial e Industrial Sound-Tronic Ltd.: *See—*
Rojas, Hernan H., 4,232,204, Cl. 179-115.50R.
Cominco Ltd.: *See—*
Hirsch, Horst E.; and Smyth, Robert W., 4,231,981, Cl. 264-102.000.
Commissariat a l'Energie Atomique: *See—*
Balligand, Pierre; Corfa, Yves; Lemercier, Pierre; Marchal, Paul; and Vertut, Jean, 4,231,171, Cl. 37-54.000.
Commonwealth Scientific and Industrial Research Organization: *See—*
Coleman, John D., 4,232,067, Cl. 428-17.000.
Peck, Norman J.; Rowland, Thomas J.; and Ashes, John R., 4,231,529, Cl. 241-189.00R.
Compagnie Internationale pour l'Informatique CII-Honeywell Bull (Societe Anonyme): *See—*
Helle, Michel, 4,232,216, Cl. 235-449.000.
Component Systems, Inc.: *See—*
Caplan, Sidney W.; and Molson, William N., 4,231,197, Cl. 52-36.000.
Compton, Peter A.; and Wood, John G., to Mars Limited. Plastics containers. 4,231,476, Cl. 206-519.000.
Congoleum Corporation: *See—*
Stetson, John R.; Graham, Alan A.; and Frisch, Rudolf, 4,232,076, Cl. 428-158.000.
Conoco, Inc.: *See—*
Carlberg, Bob L.; and Hart, Robert A., 4,231,869, Cl. 210-763.000.
Conrow, Ransom B.: *See—*
Siuta, Gerald J.; Conrow, Ransom B.; Poletto, John F.; and Bernstein, Seymour, 4,231,958, Cl. 260-507.00R.
Consiglio Nazionale Delle Ricerche: *See—*
Mengoli, Giuliano; Daolio, Sergio; Giulio, Ugo; and Folonari, Carlo, 4,231,851, Cl. 204-181.00R.
Conti, Luigi: *See—*
Urbinati, Mario; and Conti, Luigi, 4,231,344, Cl. 123-518.000.
Continental Group, Inc., The: *See—*
Hasegawa, Gary K., 4,231,487, Cl. 220-269.000.
Newman, Fred C., 4,231,605, Cl. 294-87.200.
Continental Oil Company: *See—*
Kulik, Metro D., 4,231,996, Cl. 423-242.000.
Lancet, Michael S.; and Curran, George P., 4,231,760, Cl. 48-197.00R.
Control Data Corporation: *See—*
Burke, Robert G.; and Martin, Robert F., 4,232,294, Cl. 340-147.0LP.
Cook, John N.: *See—*
Burke, James W.; and Cook, John N., 4,231,391, Cl. 137-343.000.
Cooper, Edgar R.: *See—*
Adams, Halbert E.; Cooper, Edgar R.; Ford, Lowell D.; Johnson, Delbert C.; and Warren, Gregory L., 4,232,378, Cl. 367-36.000.
Cooper, Izates C., to Myers, Lawrence F. Guide line holder. 4,231,156, Cl. 33-1.0LE.
Cooper, William J., to International Telephone and Telegraph Corporation. Method of making a bellows. 4,231,824, Cl. 156-73.100.
Cooperation Pharmaceutique Francaise: *See—*
Durlach, Jean P., 4,232,054, Cl. 426-618.000.
Copal Company Limited: *See—*
Saito, Toshihisa; and Inoue, Nobuyoshi, 4,231,650, Cl. 354-246.000.
Cordis Dow Corp.: *See—*
Lipps, Bennie J.; Murphy, William P., Jr.; and Mather, Frank W., III, 4,231,871, Cl. 210-87.000.
Corfa, Yves: *See—*
Balligand, Pierre; Corfa, Yves; Lemercier, Pierre; Marchal, Paul; and Vertut, Jean, 4,231,171, Cl. 37-54.000.
Cornell-Hoskinson Manufacturing Corp.: *See—*
Hoskinson, Gordon H., 4,231,304, Cl. 110-257.000.
Corning Glass Works: *See—*
Lawless, William N., 4,231,231, Cl. 62-514.00R.
Lipp, George D., 4,231,371, Cl. 128-303.100.
Cornish, Robert N., to Holset Engineering Company Limited. Thermostatically controlled fan clutch. 4,231,457, Cl. 192-82.00T.
Corrigan, Francis R., to General Electric Company. Large boron nitride abrasive particles. 4,231,980, Cl. 264-84.000.
Corris, Charles J.; Hollingsworth, Charles M.; Kosicki, Witold W.; and Potter, Robert T., to Horsman Dolls Inc. Remote-control doll assembly. 4,231,184, Cl. 46-265.000.
Corsetti, Richard M., to Craig Systems Corporation. Demountable transporter for containers. 4,231,709, Cl. 414-458.000.
Cosley, John V.: *See—*
Chung, David H.; and Cosley, John V., 4,232,374, Cl. 364-900.000.
Cottatellucci, Ezio, to Societa Italiana Telecomunicazioni Siemens S.p.A. Data-transmission system using binary split-phase code. 4,232,387, Cl. 371-47.000.
Cotton, Incorporated: *See—*
Winch, Allen R., 4,231,129, Cl. 8-149.100.
Coutinho de Assis, Ruy: *See—*
Valladares Barrocas, Helcio V; de Castro M. da Silva, Joao B.; and Coutinho de Assis, Ruy, 4,232,179, Cl. 585-640.000.
Cowx, Henry; and Urbain, Jean-Luc. Rubber latex compounds. 4,231,912, Cl. 260-29.7SQ.
CRAF Sud: *See—*
Monguzzi, Riccardo; Pifferi, Giorgio; Pinza, Mario; and Broccali, Giampietro, 4,231,927, Cl. 260-239.100.
Craig, James C.: *See—*
Wilson, James F.; and Craig, James C., 4,231,827, Cl. 156-214.000.
Craig Systems Corporation: *See—*
Corsetti, Richard M., 4,231,709, Cl. 414-458.000.
Crawford, Donald C.: *See—*
Aterianus, John S.; and Crawford, Donald C., 4,231,558, Cl. 270-60.000.

Crawford, Thomas C., to Pfizer Inc. Preparation of ascorbic acid intermediates. 4,232,168, Cl. 560-174.000.

Crawley, Lantz S.: *See*—
Fanshawe, William J.; Epstein, Joseph W.; Crawley, Lantz S.; Hofmann, Corris M.; and Safir, Sidney R., 4,231,935, Cl. 260-326.50B.

Crill, James: *See*—
Dickey, Fred M.; White, Jerry R.; and Crill, James, 4,231,656, Cl. 355-71.000.

Crookston, James A., to A. P. Green Refractor. High density low porosity refractory product and process for making the same. 4,231,978, Cl. 264-63.000.

Crotzer, Milburn E.: *See*—
Lang, Glenn E.; Crotzer, Milburn E.; and Fuoto, John S., 4,231,328, Cl. 122-504.000.

Crouse, Jere W., to Beloit Corporation. Trim chute and method. 4,231,272, Cl. 83-98.000.

Croxton, John M., to J. Nesbit-Evans & Co. Ltd. Hospital beds. 4,231,124, Cl. 5-63.000.

CSELT - Centro Studi e Laboratori Telecomunicazioni S.p.A.: *See*—
De Padova, Salvatore; Pagana, Enrico; and Rosenga, Giorgio, 4,232,322, Cl. 343-781.00P.
Fabri, Bruno, 4,232,272, Cl. 330-294.000.

Cuangani, Pushpkumar D.: *See*—
Baxter, Samuel; and Cuangani, Pushpkumar D., 4,232,130, Cl. 521-143.000.

Cuatrecasas, Pedro: *See*—
Miller, Richard J.; Chang, Kwen-Jen; and Cuatrecasas, Pedro, 4,231,923, Cl. 260-112.50R.

Cuomo, Jerome J.; Gangulee, Amitava; and Kobliska, John, to International Business Machines Corporation. Amorphous metallic and nitrogen containing alloy films. 4,231,816, Cl. 148-31.550.

Curran, George P.: *See*—
Lancet, Michael S.; and Curran, George P., 4,231,760, Cl. 48-197.00R.

Czajkowski, Albert J.; and Schafer, David E., to Monsanto Company. Compositions and methods for reducing herbicidal injury. 4,231,786, Cl. 71-100.000.

Dadea, Giovanni M.: *See*—
Calmanti, Giulio; Gafa, Salvatore; Dadea, Giovanni M.; Gatti, Alfonso; and Burzio, Fulvio, 4,231,841, Cl. 162-5.000.

Dahle, Orvar; Einarsson, Olov; Lindkvist, Folke; and Valdemarsson, Stefan, to ASEA Aktiebolag. Method and apparatus for attaching two objects. 4,231,145, Cl. 29-432.000.

Dahn, C. James; Morita, Douglas R.; and Tulis, Allen J., to United States of America, Air Force. Submissile disposal system. 4,231,293, Cl. 102-7.200.

Dailey, Rodney E.: *See*—
Marcantonio, Arnold F.; and Dailey, Rodney E., 4,232,065, Cl. 427-226.000.

Daimler-Benz Aktiengesellschaft: *See*—
Forster, Hans-Joachim, 4,231,295, Cl. 104-245.000.
Frankle, Gerhard; and Woschee, Dieter, 4,231,346, Cl. 123-457.000.
Haberle, Fritz; Riechers, Daniel; and Heusel, Richard, 4,231,601, Cl. 293-136.000.
Krugener, Rolf; and Kurth, Hermann W., 4,231,244, Cl. 70-422.000.
Scherenberg, Hans O.; and Andres, Rudolf, 4,231,592, Cl. 280-808.000.

Dainippon Screen Seizo Kabushiki Kaisha: *See*—
Sakamoto, Seiya; Hohki, Tetsuo; and Saito, Isao, 4,232,344, Cl. 358-298.000.

Dalton, Raymond F., to Imperial Chemical Industries Limited. Composition used for extracting copper from aqueous copper salts. 4,231,888, Cl. 252-182.000.

Daniel, Don H. Automotive keyless security system. 4,232,289, Cl. 340-64.000.

Danielson, Gordon C.: *See*—
Shanks, Howard R.; Bevolo, Albert J.; Danielson, Gordon C.; and Weber, Michael F., 4,232,097, Cl. 429-44.000.

Daolio, Sergio: *See*—
Mengoli, Giuliano; Daolio, Sergio; Giulio, Ugo; and Folonari, Carlo, 4,231,851, Cl. 204-181.00R.

Data Information Systems Corporation: *See*—
McConnell, George B., 4,232,295, Cl. 340-152.00R.

Daugiras, Kristupas; and Elguindy, Samir M., to Vapor Corporation. Linear output force door operator. 4,231,192, Cl. 49-363.000.

Davidson, William W., Jr., to North Shore Precision Research Corporation. Printing press. 4,231,291, Cl. 101-137.000.

Davies, Alan: *See*—
Boyle, Francis T.; and Davies, Alan, 4,232,032, Cl. 424-269.000.

Davis, Carl W.; and Murray, Joseph E., Jr., to Polaroid Corporation. Camera with telescoping dual actuators. 4,231,645, Cl. 354-145.000.

Davis, Kerwin L., to Esco Corporation. Excavating tooth. 4,231,173, Cl. 37-142.00R.

Davis, Kirk E., to Lubrizol Corporation, The. Nitro phenol-amine condensates, methods of making same, fuels and additive concentrates containing them. 4,231,757, Cl. 44-63.000.

Davy-Loewy Ltd.: *See*—
Middleton, Anthony E.; and McQuillin, Brian, 4,231,701, Cl. 414-730.000.

Day, William H., to National Research Development Corporation. Endoprosthetic orthopaedic devices. 4,231,120, Cl. 3-1.910.

Dayco Corporation: *See*—
Ensley, Rufus N.; Haren, Doyle V.; Logan, Arthur D.; and McLean, Michael E., 4,231,835, Cl. 156-361.000.

de Blok, Jan F.: *See*—
Vander, Timen; Thijssen, Nicolaas J.; de Blok, Jan F.; and Middel, Jan, 4,231,845, Cl. 202-113.000.

DEC GmbH: *See*—
Schletter, Peter, 4,231,324, Cl. 119-14.170.

de Castro M. da Silva, Joao B.: *See*—
Valladares Barrocas, Helcio V; de Castro M. da Silva, Joao B.; and Coutinho de Assis, Ruy, 4,232,179, Cl. 585-640.000.

Dechenne, Roger; and Hubert, Guy, to Solvay & Cie. Hollow article made of an oriented thermoplastic. 4,231,483, Cl. 220-66.000.

Decker, Forrest W.: *See*—
Kenton, Hobart E.; and Decker, Forrest W., 4,232,218, Cl. 250-222.0PC.

Deep Steam Extraction (1974) Ltd.: *See*—
Probost, Miroslav, 4,231,133, Cl. 15-300.00A.

De Felice, Wilfried, to Hoechst Aktiengesellschaft. Blister package for medicaments safe from children. 4,231,477, Cl. 206-532.000.

Dehnert, Johannes; and Juenemann, Werner, to BASF Aktiengesellschaft. Dyeing of cellulose-containing textile material and novel dyes for use therein. 4,231,746, Cl. 8-680.000.

DeLacy, James P.; and Lechner, Robert H., to Gould Inc. Voltage sensing and load measuring automatic reclosing system for D-C circuit breakers. 4,232,232, Cl. 307-139.000.

Delgado, Luis D., to Vicon Espana S.A. Rake with pivotable arms. 4,231,218, Cl. 56-377.000.

Delonge, Jean-Claude L.: *See*—
Ayache, Michel R.; Delonge, Jean-Claude L.; and Marey, Daniel J., 4,231,704, Cl. 416-95.000.

Deltrap, Johan H. M., to N.V. Optische Industrie "De Oude Delft". Binocular night glass. 4,232,222, Cl. 250-333.000.

Demick, Eugene; and Van Haasteren, Adrian J., Jr., to Bergen Expo Systems, Inc. Photographic film projection dissolve system for arc lamp projectors. 4,231,643, Cl. 353-86.000.

Demoute, Jean-Pierre: *See*—
Martel, Jacques; Tessier, Jean; and Demoute, Jean-Pierre, 4,231,932, Cl. 260-326.00A.

Dengel, Ottmar H.: *See*—
Beckert, Werner F.; Barber, William H.; and Dengel, Ottmar H., 4,231,891, Cl. 252-188.000.

Denny, Arthur F.; and Sherman, John D., to Union Carbide Corporation. Zeolite agglomerates for detergent formulations. 4,231,887, Cl. 252-174.190.

De Padova, Salvatore; Pagana, Enrico; and Rosenga, Giorgio, to CSELT - Centro Studi e Laboratori Telecomunicazioni S.p.A. Antenna having radiation pattern with main lobe of generally elliptical cross-section. 4,232,322, Cl. 343-781.00P.

Dependable-Fordath, Inc.: *See*—
Flock, Steven D.; and Hayes, Roger A., 4,231,664, Cl. 366-35.000.

Deraedt, Roger: *See*—
Teutsch, Jean G.; and Deraedt, Roger, 4,232,015, Cl. 424-243.000.

Derrick, Danny O.; and Looney, Donald F. Attachment device for flexible films and fabrics. 4,231,141, Cl. 24-243.00K.

DeSombre, Eugene R.: *See*—
Jensen, Elwood V.; and DeSombre, Eugene R., 4,232,001, Cl. 424-1.000.

Dessauer, Rolf, to Du Pont de Nemours, E. I., and Company. Marking transfer sheets. 4,232,108, Cl. 430-259.000.

Deutsch, Ralph, to Kawai Musical Instrument Mfg. Co. Ltd. Adaptive computation in a digital tone synthesizer. 4,231,278, Cl. 84-1.190.

Deutsche Nemectron GmbH: *See*—
Nippel, Frank, 4,231,168, Cl. 35-39.000.

Deutsche Texaco Aktiengesellschaft: *See*—
Brandes, Gunter; Wollner, Johannes; Neier, Wilhelm; and Webers, Werner, 4,231,966, Cl. 568-396.000.

Develop KG Dr. Eisbein & Co.: *See*—
Moser, Kurt; and Wegmann, Helmut, 4,231,652, Cl. 355-3.0DR.

DeVries, Robert C.; Lee, Minyoung; Szala, Lawrence E.; and Tuft, Roy E., to General Electric Company. Polycrystalline diamond body and process. 4,231,195, Cl. 51-307.000.

Deyoe, Charles W.; and Bartley, Erle E., to Kansas State University Research Foundation. Liquid starch-urea ruminant feed and method of preparing same. 4,232,046, Cl. 426-69.000.

Diagnostic Reagents, Inc.: *See*—
Dowben, Robert M.; and Bunting, James R., 4,231,750, Cl. 23-230.00B.

Diamond Shamrock Corporation: *See*—
Pohto, Gerald R.; and Olson, Richard O., 4,231,143, Cl. 29-281.500.

Diana, Guy D.; and Carabateas, Philip M., to Sterling Drug Inc. 4-[6-(2-Chloro-4-methoxyphenoxy)hexyl]-3,5-diethyl-1-(2-pyridinyl)-1H-pyrazole. 4,232,161, Cl. 546-279.000.

Diasonics: *See*—
Waxman, Albert S.; and Havlice, James F., 4,231,373, Cl. 128-660.000.

Dick, Pierre R.; and Rombi, Max. Novel soluble derivatives of 2,4-diamino pyrimidine. 4,232,023, Cl. 424-251.000.

Dickens, Lawrence E.; and Maki, Douglas W., to United States of America, Army. Microwave oscillator for microwave integrated circuit applications. 4,232,277, Cl. 331-107.0DP.

Dickerson, Carroll D.: *See*—
Wotton, David R.; Dickerson, Carroll D.; and Makowski, Lawrence A., 4,231,588, Cl. 280-661.000.

Dickey, Fred M.; White, Jerry R.; and Crill, James, to Boeing Company, The. Apparatus and method of converting an image on a transparency to line art on a recording medium. 4,231,656, Cl. 355-71.000.

Dietz, Markus S. Automobile mechanic's aid. 4,232,357, Cl. 362-61.000.

Di Giacomo, Peter M.; and Dines, Martin B., to Occidental Research Corporation. Process for preparing layered organophosphorus inorganic polymers. 4,232,146, Cl. 528-395.000.
Digital Equipment Corporation: *See—*
Levy, John V.; Rodgers, David P.; Stewart, Robert E.; and Casabona, Richard J., 4,232,366, Cl. 364-200.000.
Dillard, Bill J.: *See—*
Hill, Lewis J.; and Dillard, Bill J., 4,231,242, Cl. 70-347.000.
Dillitzer, Manfred, to Perfecta Rolladen Karl & Co. Roller shutter. 4,232,309, Cl. 340-547.000.
Dillon, Peter L. P.: *See—*
Horak, Jerry R.; Dillon, Peter L. P.; and Firth, Ronald R., 4,232,329, Cl. 358-9.000.
Di Mola, Nunzio: *See—*
Winters, Giorgio; and Di Mola, Nunzio, 4,232,017, Cl. 424-246.000.
Dines, Martin B.: *See—*
Di Giacomo, Peter M.; and Dines, Martin B., 4,232,146, Cl. 528-395.000.
Dion, Donald F.; and Wojcik, David R., to RCA Corporation. Raster display refresh system. 4,232,376, Cl. 365-222.000.
Ditzel, Heinz; and Ditzel, Werner. Indexing devices. 4,231,159, Cl. 33-174.0TD.
Ditzel, Werner: *See—*
Ditzel, Heinz; and Ditzel, Werner, 4,231,159, Cl. 33-174.0TD.
Dixon, Robert W., to Chas. M. Bailey Co., Inc. Backflow preventing valve. 4,231,387, Cl. 137-218.000.
Dlugopolski, Joseph, to Fidelity Container Corporation. Outer mailing jacket. 4,231,472, Cl. 206-309.000.
Dobkin, Robert C.; Isbell, Tim D.; Miller, Bernard D.; and Sample, Lawrence R., to National Semiconductor Corporation. Instrumentation amplifier with extended common mode range. 4,232,271, Cl. 330-258.000.
Dr. Eduard Fresenius Chemisch-Pharmazeutische Industrie KG Apparatebau KG: *See—*
Schael, Wilfried, 4,231,366, Cl. 128-214.00E.
Dr. Ing. h.c.F. Porsche Aktiengesellschaft: *See—*
Braun, Walter; Burst, Hermann; and Peter, Dietmar, 4,231,600, Cl. 293-128.000.
Dr. Ing. Rudolf Hell GmbH: *See—*
Sommer, Ruediger, 4,232,343, Cl. 358-296.000.
Dodd, Roger Y., to American National Red Cross. Antibody-specific solid phase immunoadsorbent, preparation thereof, and antibody purification therewith. 4,232,004, Cl. 424-89.000.
Dolce, Giuliano: *See—*
Poetsch, Eike; Uhl, Jurgen; Marx, Dieter; Strehlow, Wighard; Muller-Calgan, Helmut; and Dolce, Giuliano, 4,232,016, Cl. 414-244.000.
Dolmar Maschinenfabrik GmbH & Co.: *See—*
Mathner, Manfred; and Thomsen, Peter, 4,231,221, Cl. 60-319.000.
Domicent, Alain. Painting booth. 4,231,289, Cl. 98-115.0SB.
Dorius, Carl B., to American Gilsonite Company. Water retardant insulation composition comprising treated low density granular mineral material and finely divided limestone or similar carbonate or silicate mineral particles and method for using same. 4,231,884, Cl. 252-62.000.
Doss, Dwight E.: *See—*
Keeling, Michael C.; and Doss, Dwight E., 4,231,807, Cl. 136-251.000.
Doty, James K.: *See—*
Statz, Robert J.; and Doty, James K., 4,232,174, Cl. 562-599.000.
Dow Chemical Company, The: *See—*
Burk, George A.; Reineke, Charles E.; and Wilson, Charles A., 4,232,041, Cl. 424-304.000.
Buske, Gary R., 4,232,125, Cl. 521-32.000.
Gibbs, Dale S.; Benson, Jack H.; and Fernandez, Reet T., 4,232,129, Cl. 521-137.000.
Smith, William E.; and McGee, Thomas W., 4,232,175, Cl. 568-706.000.
Dow Corning Corporation: *See—*
Fearon, Frederick W. G.; and Vincent, Gary A., 4,231,909, Cl. 260-29.1SB.
Plueddemann, Edwin P., 4,231,910, Cl. 260-29.40R.
Dow, Judith A.; and Fohl, Timothy, to GTE Products Corporation. Method of coating a lamp with a U.V. curable resin with fibers therein. 4,232,058, Cl. 427-54.100.
Dowben, Robert M.; and Bunting, James R., to Diagnostic Reagents, Inc. Methods for performing chemical assays using fluorescence and photon counting. 4,231,750, Cl. 23-230.00B.
Downs, Edgar S. Radiant heater. 4,231,735, Cl. 431-328.000.
Doyle, Holly T.: *See—*
Thomas, Wendl; Doyle, Holly T.; and Doyle, Robert O., 4,231,577, Cl. 273-238.000.
Doyle, Keith G.: *See—*
Zollman, Peter M.; and Doyle, Keith G., 4,232,345, Cl. 358-299.000.
Doyle, Robert O.: *See—*
Thomas, Wendl; Doyle, Holly T.; and Doyle, Robert O., 4,231,577, Cl. 273-238.000.
Drabek, Jozef: *See—*
Boger, Manfred; Drabek, Jozef; Mattern, Gunter; and Traber, Walter, 4,232,011, Cl. 424-200.000.
Dravo Corporation: *See—*
Cheek, Edward E., 4,231,467, Cl. 198-508.000.
Drechsel, Arno. Step-by-step irrigator. 4,231,522, Cl. 239-233.000.
Dresser Industries, Inc.: *See—*
Armstrong, Kenneth R., 4,231,971, Cl. 261-44.00B.
Eversole, James F.; and Berriman, Lester P., 4,231,383, Cl. 137-1.000.
Thompson, George J., 4,231,699, Cl. 414-687.000.
Drevin, Hakan N. Y.: *See—*
Carlsson, Jan P. E.; Axen, Rolf E. A. V.; and Drevin, Hakan N. Y., 4,231,999, Cl. 424-1.000.
Carlsson, Jan P. E.; Axen, Rolf E. A. V.; and Drevin, Hakan N. Y., 4,232,119, Cl. 435-7.000.
Drews, Ulrich; Schnurle, Hans; Horbelt, Michael; Schmidt, Bernhard; and Werner, Peter, to Robert Bosch GmbH. Apparatus for controlling an electrical switching element in internal combustion engines. 4,231,345, Cl. 123-510.000.
Drexelbrook Controls, Inc.: *See—*
Wright, William S.; and Loewenstern, Kenneth M., 4,232,300, Cl. 340-840.390.
Drury, Robert F., to Du Pont de Nemours, E. I., and Company. Synthesis of 2,5-dihydrofuran. 4,231,941, Cl. 260-346.110.
D'Silva, Themistocles D. J., to Union Carbide Corporation. Carbamate pesticidal compounds compositions and methods of use. 4,232,035, Cl. 424-270.000.
Dube, Marcel. Double-glazed building panel and filling system. 4,231,202, Cl. 52-171.000.
Dubovszky, Istvan: *See—*
Kovacsay, Istvan; Szajko nee Lorinczi, Maria; Dubovszky, Istvan; Magdanyi, Laszlo; Szailer, Ferenc; and Szatmari, Ede, 4,232,136, Cl. 525-327.000.
Dumont, Claude; Guillaume, Jacques; and Nedelec, Lucien, to Roussel Uclaf. Process for preparation of piperidyl-indoles. 4,232,031, Cl. 424-263.000.
Duncan, Rodney A.; and Hall, Wendel W. Mirror connector. 4,231,540, Cl. 248-487.000.
Dungs, Horst: *See—*
Weber, Heinrich; Lorenz, Kurt; Dungs, Horst; Kurtz, Roman; and Kersting, Hans-Joachim, 4,231,844, Cl. 201-34.000.
Dunton, Harvey R., to Associated Concrete Products, Inc. Cement and concrete mixture. 4,231,801, Cl. 106-97.000.
Du Pont de Nemours, E. I., and Company: *See—*
Dessauer, Rolf, 4,232,108, Cl. 430-259.000.
Drury, Robert F., 4,231,941, Cl. 260-346.110.
Gier, Thurman E., 4,231,838, Cl. 156-600.000.
Irwin, Robert S., 4,232,143, Cl. 528-128.000.
Irwin, Robert S., 4,232,144, Cl. 528-128.000.
Lee, Ross A., 4,232,115, Cl. 430-522.000.
Levitt, George, 4,231,784, Cl. 71-92.000.
Marquisee, Mark J., 4,232,126, Cl. 521-65.000.
Statz, Robert J.; and Doty, James K., 4,232,174, Cl. 562-599.000.
Durig, Richard F., to United States of America, Air Force. Static self-contained laser seeker system for active missile guidance. 4,231,533, Cl. 244-3.160.
Duris, Jean, to Societe Alsacienne de Constructions Mecaniques de Mulhouse. Apparatus for heat treatment of continuous textile products. 4,231,167, Cl. 34-66.000.
Durlach, Jean P., to Cooperation Pharmaceutique Francaise. Indigestable composition consisting of a metallic natural proteinate and nutritive fibers. 4,232,054, Cl. 426-618.000.
Durley, Benton A., III. Vibratory-rotary motion converters and display devices incorporating such converters. 4,232,304, Cl. 340-366.00B.
Dworkin, Robert D., to M & T Chemicals Inc. Synergistic heat stabilizer compositions containing an antimony or a bismuth compound. 4,231,895, Cl. 252-400.00A.
Dworsky, Lawrence N.; Whalin, Jeffery A.; and Glotzbach, Warren P., to Motorola, Inc. Frequency adjustment of piezoelectric resonator utilizing low energy oxygen glow device for anodizing electrodes. 4,232,239, Cl. 310-312.000.
Dyson, Evelyna C., to Revlon, Inc. Cosmetic apparatus and method. 4,232,334, Cl. 358-93.000.
E-C Apparatus Corporation: *See—*
Gorman, William W., Jr.; and Gorman, Esther M., 4,231,992, Cl. 422-258.000.
E M I Limited: *See—*
Birt, David E., 4,231,730, Cl. 425-385.000.
E. R. Squibb & Sons, Inc.: *See—*
Turk, Chester F.; and Krapcho, John, 4,232,027, Cl. 424-258.000.
E-Systems, Inc.: *See—*
Proffitt, William G., 4,232,059, Cl. 427-96.000.
E. T. Oakes Limited: *See—*
Baron, John, 4,231,666, Cl. 366-304.000.
East, Robert W.: *See—*
Rosler, Richard S.; and East, Robert W., 4,232,063, Cl. 427-94.000.
Eastern Company, The: *See—*
Pelcin, Albert L., 4,231,597, Cl. 292-164.000.
Eastman Kodak Company: *See—*
Barbee, Eugene H., 4,231,164, Cl. 34-16.000.
Gilman, Paul B., Jr.; Belly, Robert T.; Koszelak, Thaddeus D.; and Zigman, Seymour, 4,232,121, Cl. 435-32.000.
Henry, James W., 4,232,336, Cl. 358-106.000.
Horak, Jerry R.; Dillon, Peter L. P.; and Firth, Ronald R., 4,232,329, Cl. 358-9.000.
Isaacson, Henry V., 4,231,919, Cl. 260-42.530.
Eaton, Burrows P.; and Wright, William, to Carrier Corporation. Wound fin heat exchanger support. 4,231,421, Cl. 165-68.000.
Ebauches S.A.: *See—*
Randin, Jean-Paul, 4,231,641, Cl. 350-357.000.
Ebreo, Mark A.; and Koches, Andrew, to William Prym, Inc. Key clip adapted for a key case. 4,231,140, Cl. 24-237.000.

Eccles, Edward S.; and Gibson, Harry, to Smiths Industries Limited. Analogue electrical indicators having a series of electrically-energizable elements. 4,232,312, Cl. 340-753.000.

Echlin Manufacturing Company, The: *See—*
Campanini, Sergio, 4,231,286, Cl. 92-64.000.
Kuhl, Bernhard R.; and Safranek, Edward J., 4,232,207, Cl. 200-11.00R.

Eckmayer, Zdenek: *See—*
Braeumer, Klaus; Eckmayer, Zdenek; Berg, Alexander; Monsheimer, Rolf; and Pfleiderer, Ernst, 4,232,123, Cl. 435-69.000.

Edel, Gunter: *See—*
Rosbiegalle, Rudolf; Farber, Karl; Grimm, Herbert; Schmeisser, Helmut; Schonhut, Hermann; Krumnikl, Svatopluk; and Edel, Gunter, 4,231,669, Cl. 401-258.000.

Edwards, Roger D.: *See—*
Bradshaw, Michael; and Edwards, Roger D., 4,232,325, Cl. 346-76.00R.

Edwards, Roy E.; Price, Anthony G.; and Rees, John R., to Girling Limited. Master cylinder assemblies for vehicle hydraulic braking systems. 4,231,224, Cl. 60-581.000.

Edwards, Thomas W.: *See—*
Savoye, Eugene D.; Edwards, Thomas W.; and Wallace, Lloyd F., 4,232,245, Cl. 313-367.000.

EG & G, Inc.: *See—*
Caron, Roger L.; Clifford, Peter J.; and Germain, Francis R., 4,232,380, Cl. 367-88.000.

Eggler, James F.: *See—*
Schaaf, Thomas K.; and Eggler, James F., 4,232,173, Cl. 562-430.000.

Eggleston, Philip W.; and Taylor, Eugene R., Jr., to Fisher Controls Company, Inc. High-temperature bidirectional metal seal. 4,231,546, Cl. 251-173.000.

Eguchi, Takeo: *See—*
Mori, Yoshihisa; Mashimo, Norio; and Eguchi, Takeo, 4,232,202, Cl. 179-100.40E.

Einarsson, Olov: *See—*
Dahle, Orvar; Einarsson, Olov; Lindkvist, Folke; and Valdemarsson, Stefan, 4,231,145, Cl. 29-432.000.

Eiseman, Fred S., to GAF Corporation. Halophenoxy-alkoxy phosphonates and thiophosphonates. 4,231,781, Cl. 71-87.000.

Eisenberg, Robert M., to Singer Company, The. Wireless output/input system. 4,232,299, Cl. 340-171.00R.

Ekonen, Martin A.; and Blechschmidt, James L., to Ford Motor Company. Control valve for vehicle air springs and the like. 4,231,554, Cl. 267-65.00D.

Electric Power Research Institute, Inc.: *See—*
Park, Dong-Sil; Chatterji, Debajyoti; and Breiter, Manfred W., 4,232,098, Cl. 429-104.000.

Electrofabrication & Engineering Co. Ltd.: *See—*
Falconer, John D.; Proudlock, George T.; and Monsen, Geoffrey, 4,231,484, Cl. 220-89.00A.

Elguindy, Samir M.: *See—*
Daugiras, Kristupas; and Elguindy, Samir M., 4,231,192, Cl. 49-363.000.

Eliche, Jean: *See—*
Augier, Robert; Carbonari, Jean P.; and Eliche, Jean, 4,231,198, Cl. 52-91.000.

Ellmore, John W., to Challenger, Inc. Automatic door opener system. 4,231,191, Cl. 49-28.000.

Elmer, Charles W., to Inland Steel Company. Fluid pressure measuring device. 4,231,261, Cl. 73-716.000.

Elphingstone, Eugene A.; and Norman, Lewis R., to Halliburton Company. Treating subterranean well formations. 4,231,882, Cl. 252-8.55C.

Elsaber, Martin: *See—*
Schmid, Manfred; Elsaber, Martin; and Weik, Manfred, 4,231,234, Cl. 66-27.000.

Emerson Electric Co.: *See—*
Blachly, Donald L.; and Terpstra, Daniel A., 4,231,557, Cl. 269-139.000.
Newport, Harry E., Jr.; and Baysinger, Robert L., 4,231,732, Cl. 431-46.000.

Emhart Industries, Inc.: *See—*
Willitts, Benjamin R., 4,231,229, Cl. 62-196.00A.

Emo, George C.; and Grau, Thomas G. Connector contact terminal contamination probe. 4,232,262, Cl. 324-65.00P.

Emonet, Henri. Lost motion tool retainer. 4,231,580, Cl. 279-19.100.

ENERTEC: *See—*
Ley, Anthony J., 4,232,298, Cl. 340-171.00R.

Enfo Grundlagen Forschungs AG: *See—*
Hrabal, Hans; and Wimmer, Josef, 4,231,394, Cl. 137-512.000.

Engel, Steven J.: *See—*
Clouser, David E.; and Engel, Steven J., 4,232,233, Cl. 307-229.000.

Engelbrecht, Eduard. Instrument and method for transferring microbiological samples in a predeterminated gaseous environment. 4,232,120, Cl. 435-30.000.

Engelbrecht, Horst P.; and Johnson, Howard K., to General Signal Corporation. Fluids mixing apparatus. 4,231,974, Cl. 261-87.000.

Engelhard Minerals & Chemicals Corporation: *See—*
Pitts, Frank, 4,231,997, Cl. 423-263.000.

Englund, Robert M., to Sperry Corporation. Apparatus for determining the next address of a requested block in interlaced rotating memories. 4,232,365, Cl. 364-200.000.

Engstrom, William R. Extracorporeal circuit blood heat exchanger. 4,231,425, Cl. 165-156.000.

Enrico, Corvi M. Process for preparing lysergol derivatives. 4,232,157, Cl. 546-68.000.

Ensing, Lukas, to Shell Oil Company. Automatic balancing system for seismic equipment. 4,232,379, Cl. 367-43.000.

Ensley, Rufus N.; Haren, Doyle V.; Logan, Arthur D.; and McLean, Michael E., to Dayco Corporation. Apparatus for and method of making carpeting strip having integral seam-forming portion. 4,231,835, Cl. 156-361.000.

Entreprise d'Equipements Mecaniques et Hydrauliques E.M.H.: *See—*
Tuson, Samuel, 4,231,681, Cl. 405-195.000.
Tuson, Samuel, 4,231,682, Cl. 405-202.000.

Epstein, Joseph W.: *See—*
Fanshawe, William J.; Epstein, Joseph W.; Crawley, Lantz S.; Hofmann, Corris M.; and Safir, Sidney R., 4,231,935, Cl. 260-326.50B.

Erckel, Rudiger: *See—*
Gunther, Dieter; Erckel, Rudiger; Rosch, Gunter; and Probst, Heinz, 4,231,741, Cl. 8-571.000.

Erickson, Thomas D., to Owens-Corning Fiberglas Corporation. Fibrous glass manufacture using refractory bushing. 4,231,773, Cl. 65-1.000.

Ernst, Volker: *See—*
Alf, Herbert; Ernst, Volker; Hainle, Rudi; and Leipelt, Rudolf, 4,231,343, Cl. 123-556.000.

Erwin, Robert L., to Kinsey, J. D., a part interest. Rotary, segmented, expansible valves. 4,231,440, Cl. 137-246.220.

Esco Corporation: *See—*
Davis, Kerwin L., 4,231,173, Cl. 37-142.00R.

Esmond, William G. Capillary mass transfer device. 4,231,878, Cl. 210-321.00B.

Estes, John H.: *See—*
Koniz, Leon F.; and Estes, John H., 4,231,751, Cl. 23-230.00R.

Etablissements VanDoren: *See—*
Van Doren, Bernard M.; and Frank, Jacques G., 4,231,404, Cl. 144-2.00R.

Ethyl Corporation: *See—*
Malec, Robert E., 4,231,883, Cl. 252-33.400.

Etter, Peter: *See—*
Faust, Werner; and Etter, Peter, 4,232,235, Cl. 307-252.00R.

Eur-Control Kalle AB: *See—*
Ingemarsson, Gosta, 4,231,881, Cl. 210-396.000.

Eurosil GmbH: *See—*
Lingstaedt, Ernst; Moegen, Gerhard; and Wotruba, Gottfried, 4,232,261, Cl. 323-22.00R.

Eversole, James F.; and Berriman, Lester P., to Dresser Industries, Inc. Method for controlling mass flow rate. 4,231,383, Cl. 137-1.000.

Exxon Research & Engineering Co.: *See—*
Mauldin, Charles H.; and Baird, William C., Jr., 4,231,898, Cl. 252-441.000.
Sullivan, Daniel S., III; and Bridges, Wilbur L., 4,231,956, Cl. 260-465.80R.

F F Fabricators, Inc.: *See—*
Smith, Dennis W.; and Mazzacano, Paul J., 4,231,676, Cl. 404-6.000.

F. W. Payne & Son (Bickley) Limited: *See—*
Hewitt, James A., 4,231,172, Cl. 37-71.000.

Fabri, Bruno, to CSELT - Centro Studi e Laboratori Telecomunicazioni S.p.A. Feedback-stabilized multistage frequency-selective amplifier. 4,232,272, Cl. 330-294.000.

Fabricant, Norman. Dental toy. 4,231,181, Cl. 46-116.000.

Faith, James D.: *See—*
Ohnhaus, Buff; and Faith, James D., 4,231,253, Cl. 73-861.620.

Falcon Safety Products, Inc.: *See—*
Vall, Seymour, 4,231,308, Cl. 114-144.00R.

Falconer, John D.; Proudlock, George T.; and Monsen, Geoffrey, to Electrofabrication & Engineering Co. Ltd. Safety device for pressure vessels. 4,231,484, Cl. 220-89.00A.

Fanshawe, William J.; Epstein, Joseph W.; Crawley, Lantz S.; Hofmann, Corris M.; and Safir, Sidney R., to American Cyanamid Company. 1-Phenyl-3-azabicyclo[3.1.0]hexanes. 4,231,935, Cl. 260-326.50B.

Farber, Karl: *See—*
Rosbiegalle, Rudolf; Farber, Karl; Grimm, Herbert; Schmeisser, Helmut; Schonhut, Hermann; Krumnikl, Svatopluk; and Edel, Gunter, 4,231,669, Cl. 401-258.000.

Faust, Carl W., to Bell Telephone Laboratories, Incorporated. Cable adapter for converting a cable closure nozzle to a two cable entrance. 4,232,184, Cl. 174-92.000.

Faust, Werner; and Etter, Peter, to BBC Brown, Boveri & Company, Limited. Combining thyristor circuits of various circuit configurations. 4,232,235, Cl. 307-252.00R.

Fawzi, Mahdi B., to Procter & Gamble Company, The. Radioactive scanning agents with stabilizer. 4,232,000, Cl. 424-1.000.

Fearon, Frederick W. G.; and Vincent, Gary A., to Dow Corning Corporation. Polychloropropylsiloxane plasticized polyvinyl chloride compositions. 4,231,909, Cl. 260-29.1SB.

Feess, Erich; and Reinhardt, Friedrich, to Hoechst Aktiengesellschaft. Process for pad-dyeing and printing fabrics made of cellulose and/or regenerated modified cellulose and optionally polyester fibers. 4,231,745, Cl. 8-552.000.

Feinland, Seymour; and Kleinschmitt, David, to Pitney Bowes Inc. Phase shift correction for displacement measuring systems using quadrature. 4,231,662, Cl. 356-373.000.

Feldmann, Hugo: *See—*
Beerens, Hugo; Feldmann, Hugo; and Schlanzke, Claus G., 4,231,553, Cl. 266-113.000.

Feltzin, Joseph: *See*—
Ferrarini, L. James, Jr.; and Feltzin, Joseph, 4,232,133, Cl. 525-452.000.
Fenton, James E., to Ford Motor Company. Air fuel control system for Stirling engine. 4,231,222, Cl. 60-524.000.
Fernandez, Reet T.: *See*—
Gibbs, Dale S.; Benson, Jack H.; and Fernandez, Reet T., 4,232,129, Cl. 521-137.000.
Ferrarini, L. James, Jr.; and Feltzin, Joseph, to ICI Americas Inc. Polyisocyanurate containing molding compositions. 4,232,133, Cl. 525-452.000.
Ferro Corporation: *See*—
Ryan, John R.; and Shalita, Paul, 4,231,830, Cl. 156-232.000.
Fichtel & Sachs AG: *See*—
Bergles, Eduard, 4,231,264, Cl. 474-80.000.
Fidelity Container Corporation: *See*—
Dlugopolski, Joseph, 4,231,472, Cl. 206-309.000.
Filipovic, Dominik, to U.S. Philips Corporation. Remote control/digital tuning interface with parallel operation with manual switches. 4,232,296, Cl. 340-167.00R.
Filippi, Frederico. Video telephone apparatus. 4,232,196, Cl. 179-2.0TV.
Filterwerke Mann & Hummel GmbH: *See*—
Alf, Herbert; Ernst, Volker; Hainle, Rudi; and Leipelt, Rudolf, 4,231,343, Cl. 123-556.000.
Finger, Richard H.; and Michel, Thomas J., to Santek, Inc. Ionization voltage source. 4,232,355, Cl. 361-235.000.
Finike Italiana Marposs S.p.A.: *See*—
Possati, Mario, 4,231,158, Cl. 33-149.00J.
Fink, Joel H.; and Molvik, Arthur W., to United States of America, Energy. Compact, maintainable 80-KeV neutral beam module. 4,232,244, Cl. 313-363.000.
Finkenzeller, Johann; Holzermer, Guenter; and Wenzek, Gerhard, to Siemens Aktiengesellschaft. X-ray examination apparatus. 4,232,227, Cl. 250-468.000.
Finley, Billy L. Roof ventilating aperture seal. 4,231,288, Cl. 98-43.00R.
Finomvegyszer Szovetkezet: *See*—
Kovacsay, Istvan; Szajko nee Lorinczi, Maria; Dubovszky, Istvan; Magdanyi, Laszlo; Szailer, Ferenc; and Szatmari, Ede, 4,232,136, Cl. 525-327.000.
Firmenich, S.A.: *See*—
Flament, Ivon, 4,232,156, Cl. 544-335.000.
Firth, Ronald R.: *See*—
Horak, Jerry R.; Dillon, Peter L. P.; and Firth, Ronald R., 4,232,329, Cl. 358-9.000.
Fischer, Adolf: *See*—
Hanisch, Horst; Winkelmann, Heinrich; and Fischer, Adolf, 4,231,265, Cl. 474-152.000.
Fisher Controls Company, Inc.: *See*—
Eggleston, Philip W.; and Taylor, Eugene R., Jr., 4,231,546, Cl. 251-173.000.
Fisons Limited: *See*—
Orr, Thomas S. C.; Hall, David E.; and Mann, John, 4,232,012, Cl. 424-232.000.
Fladby, Tron-Halvard, to A/S Akers Mek. Verksted. Process for regeneration of a filter medium. 4,231,870, Cl. 210-797.000.
Flament, Ivon, to Firmenich, S.A. Acyl-pyrimidines. 4,232,156, Cl. 544-335.000.
Fleischer, Henry. Collapsible frames for baby carriers. 4,231,587, Cl. 280-647.000.
Fleishman, Herman B., to United States of America, Navy. Tactical nagivation and communication system. 4,232,313, Cl. 343-6.00R.
Flock, Steven D.; and Hayes, Roger A., to Dependable-Fordath, Inc. Method and apparatus for combining high speed horizontal and high speed vertical continuous mixing of chemically bonded foundry sand. 4,231,664, Cl. 366-35.000.
Florvall, Gosta L.; and Ogren, Sven O., to Astra Lakemedel Aktiebolag. 2,6-Dialkoxybenzamides, intermediates, pharamaceutical compositions and methods for treatment of psychotic disorders. 4,232,037, Cl. 424-274.000.
FMC Corporation: *See*—
Aterianus, John S.; and Crawford, Donald C., 4,231,558, Cl. 270-60.000.
Gibbons, Harold M., deceased, 4,231,398, Cl. 137-615.000.
McGinley, Emanuel J.; and Zuban, Joseph M., 4,231,802, Cl. 106-197.00C.
Fohl, Timothy: *See*—
Dow, Judith A.; and Fohl, Timothy, 4,232,058, Cl. 427-54.100.
Foley, James W.: *See*—
Bloom, Stanley M.; Borror, Alan L.; and Foley, James W., 4,231,929, Cl. 260-243.300.
Foley, Thomas P.: *See*—
Mosciatti, Roger; Foley, Thomas P.; and Moritz, Frederick G., 4,232,353, Cl. 361-172.000.
Folonari, Carlo: *See*—
Mengoli, Giuliano; Daolio, Sergio; Giulio, Ugo; and Folonari, Carlo, 4,231,851, Cl. 204-181.00R.
Fontana, Jack: *See*—
Zeldin, Arkady; Carciello, Neal; Kukacka, Lawrence; and Fontana, Jack, 4,231,917, Cl. 260-37.0SB.
Foote, John P., to U.S. Armament Corporation. Automatic and semiautomatic small caliber conversion system. 4,231,177, Cl. 42-16.000.
Ford, Lowell D.: *See*—
Adams, Halbert E.; Cooper, Edgar R.; Ford, Lowell D.; Johnson, Delbert C.; and Warren, Gregory L., 4,232,378, Cl. 367-36.000.
Ford Motor Company: *See*—
Ekonen, Martin A.; and Blechschmidt, James L., 4,231,554, Cl. 267-65.00D.
Fenton, James E., 4,231,222, Cl. 60-524.000.
Logothetis, Eleftherios M.; Laud, Kamlakar R.; and Park, John K., 4,231,254, Cl. 73-362.0AR.
Schechter, Michael M., 4,231,285, Cl. 92-34.000.
Wotton, David R.; Dickerson, Carroll D.; and Makowski, Lawrence A., 4,231,588, Cl. 280-661.000.
Forster, Hans-Joachim, to Daimler-Benz Aktiengesellschaft. Traffic system for track-tied vehicles with steerable axle. 4,231,295, Cl. 104-245.000.
Forward, Robert L., to Hughes Aircraft Company. Network for simulating low temperature resistors. 4,232,280, Cl. 333-213.000.
Fox, Ulles E.: *See*—
Gorenc, Edward J.; Fox, Ulles E.; and Lesko, Imre A., 4,231,246, Cl. 72-412.000.
Fradin, Raymond. Flexible and sewable hinge. 4,231,135, Cl. 16-150.000.
Francese, Renato: *See*—
Baldi, Luciano; Francese, Renato; and Collecchia, Franco, 4,232,153, Cl. 544-204.000.
Frank, Jacques G.: *See*—
Van Doren, Bernard M.; and Frank, Jacques G., 4,231,404, Cl. 144-2.00R.
Frank & Schulte GmbH: *See*—
Schramm, Hans; and Schramm, Klaus, 4,231,798, Cl. 75-256.000.
Frankle, Gerhard; and Woschee, Dieter, to Daimler-Benz Aktiengesellschaft. Control arrangement for a supercharged diesel engine. 4,231,346, Cl. 123-457.000.
Franklin Electric Subsidiaries, Inc.: *See*—
Hall, James F., Jr.; Lake, Ralph J., Jr.; and Scholder, William G., 4,231,439, Cl. 177-25.000.
Franz, Henry H. Bottle packaging and unpackaging machine. 4,231,697, Cl. 414-37.000.
Franz, John E.; and Kaufman, Robert J., to Monsanto Company. N-Carbobenzoxy-N-phosphonomethylglycine thioesters. 4,231,782, Cl. 71-87.000.
Franzen, Olof K.; Hallstrom, Ulf; and Petersson, Bengt A., to Uddeholms Aktiebolag. Composite steel material and composite steel tool made from this material. 4,232,096, Cl. 428-683.000.
Frederick, Sherman B.: *See*—
Hedtke, Robert G.; Harrom, Harley A.; Kelley, Wilfred H., Jr.; and Frederick, Sherman B., 4,231,450, Cl. 187-9.00R.
Freeman Chemical Corporation: *See*—
Carlstrom, William L.; and Maechtle, Gary L., 4,232,085, Cl. 428-315.000.
Freeny, Charles C., Jr. Quantized hyperbolic and inverse hyperbolic object location system. 4,232,317, Cl. 343-112.00R.
Freitag, Dieter: *See*—
Schmidt, Manfred; Bandtel, Eberhard; Traudisch, Walter; Spott, Georg; and Freitag, Dieter, 4,232,134, Cl. 525-506.000.
French, David W., to Johns-Manville Corporation. Plastic pipe joint and method and assembly for making same. 4,231,983, Cl. 264-249.000.
French, Richard C., to U.S. Philips Corporation. Radio transmission systems. 4,232,392, Cl. 455-105.000.
Frey, Ernst: *See*—
Kobler, Richard, 4,232,346, Cl. 360-71.000.
Friedemann, Peter: *See*—
Behrendt, Wolfgang; Bohnhage, Detlef; Friedemann, Peter; Frolich, Bernhard; and Orzessek, Reinhold, 4,231,667, Cl. 400-208.000.
Friedling, Gerard; and Chuard, Marcel. Removable two-way connector for a faucet nozzle. 4,231,400, Cl. 137-798.000.
Friedman, Mendel: *See*—
Koenig, Nathan H.; and Friedman, Mendel, 4,231,747, Cl. 8-127.600.
Frisch, Rudolf: *See*—
Stetson, John R.; Graham, Alan A.; and Frisch, Rudolf, 4,232,076, Cl. 428-158.000.
Fritjofsson, Sture F. E.: *See*—
Ljungqvist, Stig-Ove E.; Hammarstrom, Bernth S.; and Fritjofsson, Sture F. E., 4,231,836, Cl. 156-405.00P.
Frohberger, Paul-Ernst: *See*—
Kramer, Wolfgang; Buchel, Karl H.; Pflugbeil, Wolf-Dietrich; Frohberger, Paul-Ernst; and Brandes, Wilhelm, 4,232,033, Cl. 424-269.000.
Frolich, Bernhard: *See*—
Behrendt, Wolfgang; Bohnhage, Detlef; Friedemann, Peter; Frolich, Bernhard; and Orzessek, Reinhold, 4,231,667, Cl. 400-208.000.
Fuehrer, Reece R., to General Motors Corporation. Vehicle brake system with transmission and internal brake. 4,231,455, Cl. 192-4.00A.
Fuhrer, Jack S., to RCA Corporation. Defect compensation for color television. 4,232,340, Cl. 358-167.000.
Fuhrmann, Wolfgang: *See*—
Zurner, Hansjurgen; and Fuhrmann, Wolfgang, 4,231,543, Cl. 251-57.000.
Fuji Photo Film Co., Ltd.: *See*—
Adachi, Keiichi; Shishido, Tadao; and Mitsui, Akio, 4,232,114, Cl. 430-504.000.
Iwasaki, Masayuki; Sato, Shigeru; Inoue, Yasuo; and Nagashima, Akira, 4,232,106, Cl. 430-170.000.
Miyazako, Takushi; and Nagatomo, Shigeru, 4,232,111, Cl. 430-355.000.

Naoi, Takashi; and Horie, Ikutard, 4,232,117, Cl. 430-539.000.
Tabei, Masatoshi; Kawaziri, Kazuhiro; and Nakajima, Yosuke, 4,231,808, Cl. 136-260.000.
Fujii, Setsuro: *See—*
Kajihara, Motoyoshi; Hamakawa, Toshihiro; Shibata, Toshiaki; Suzue, Takashi; and Fujii, Setsuro, 4,232,007, Cl. 424-177.000.
Fujii, Yuji, to Shimano Industrial Company, Limited. Brake holder with protuberances for holding a shoe body in place. 4,231,451, Cl. 188-73.100.
Fujikawa, Kanichi: *See—*
Nishiyama, Ryuzo; Takahashi, Ryohei; Fujikawa, Kanichi; Nasu, Rikuo; and Sakashita, Nobuyuki, 4,231,787, Cl. 71-107.000.
Fujimori, Noboru: *See—*
Okauchi, Ken; Koitabashi, Takeo; and Fujimori, Noboru, 4,232,118, Cl. 430-574.000.
Fujimoto, Toshio. Clasp for personal ornaments or furnishings. 4,231,137, Cl. 24-201.00B.
Fujishima, Masakazu, to Nippon Gakki Seizo Kabushiki Kaisha. Station-signal frequency indication system for radio receiver. 4,232,394, Cl. 455-158.000.
Fujishita, Toshio: *See—*
Hirai, Kentaro; Fujishita, Toshio; and Ishiba, Teruyuki, 4,231,930, Cl. 260-245.500.
Fujita, Isao; Onoda, Mamoru; Kawaguchi, Fumikazu; Takenake, Yoshimichi; and Tsutaya, Tadao, to Kobe Steel, Limited. Fired iron-ore pellets having macro pores. 4,231,797, Cl. 75-256.000.
Fujita, Masao; and Kitaori, Kiyoshi, to Nissan Shatai Kabushiki Kaisha; and Kokusan Kinzoku Kogyo Kabushiki Kaisha. Screw plug assembly. 4,231,240, Cl. 70-173.000.
Fujitsu Limited: *See—*
Hattori, Seizi; Makino, Koichi; Nakagawa, Takehiko; and Shinohara, Masayoshi, 4,232,061, Cl. 427-130.000.
Terada, Akira; Hattori, Seizi; Ishii, Yoshikazu; Nohara, Akira; Inagaki, Nobuo; Matsuda, Wakatake; and Kawakami, Susumu, 4,232,071, Cl. 428-64.000.
Fujiu, Masayoshi; and Hida, Tetsuo, to Showa Denki K.K. Method for incineration of organic chlorine compound and incinerator used therefor. 4,231,303, Cl. 110-245.000.
Fukazawa, Jinpei: *See—*
Hatsuno, Hiroshi; Fukazawa, Jinpei; Fukushima, Mitsuo; and Ogawa, Shinji, 4,231,251, Cl. 73-119.00A.
Fukuda, Hideo; Morikawa, Hiroichi; Kamezawa, Yasutoki; and Aizawa, Tatsuo, to Mita Industrial Company Ltd. Photosensitive paper for electrophotography with an electrically conductive coating of a fluorine resin. 4,232,101, Cl. 430-56.000.
Fukui, Akito: *See—*
Konoki, Keizo; Nobue, Michio; Fukui, Akito; and Inoue, Shigeru, 4,231,961, Cl. 564-65.000.
Fukushima, Mitsuo: *See—*
Hatsuno, Hiroshi; Fukazawa, Jinpei; Fukushima, Mitsuo; and Ogawa, Shinji, 4,231,251, Cl. 73-119.00A.
Fukushima, Shigeki; and Ohashi, Tadahiro, to Tokyo Shibaura Denki Kabushiki Kaisha. Method of controlling the deceleration of a reversing mill. 4,232,369, Cl. 364-476.000.
Fukuzawa, Kenichi: *See—*
Sakurai, Soichi; Ando, Kunio; and Fukuzawa, Kenichi, 4,232,246, Cl. 313-414.000.
Funada, Fumiaki; Nonomura, Keisaku; Uede, Hisashi; and Wada, Tomio, to Sharp Kabushiki Kaisha. Matrix type liquid crystal display panel. 4,231,640, Cl. 350-336.000.
Fuoto, John S.: *See—*
Lang, Glenn E.; Crotzer, Milburn E.; and Fuoto, John S., 4,231,328, Cl. 122-504.000.
Fusinski, Richard E., to General Motors Corporation. Broadband transmitting antenna for test chamber. 4,232,319, Cl. 343-703.000.
Futaba Denshi Kogyo K.K.: *See—*
Kishino, Takao; and Tanaka, Gentaro, 4,232,251, Cl. 315-167.000.
GAF Corporation: *See—*
Eiseman, Fred S., 4,231,781, Cl. 71-87.000.
Gafa, Salvatore: *See—*
Calmanti, Giulio; Gafa, Salvatore; Dadea, Giovanni M.; Gatti, Alfonso; and Burzio, Fulvio, 4,231,841, Cl. 162-5.000.
Galvin, Michael E.; and Whitwell, Robert J., to Carrier Corporation. Combination process tube and vibration attenuator for a refrigeration circuit. 4,231,228, Cl. 62-77.000.
Gambro AB: *See—*
Carlsson, Per-Olov A. V.; and Stenberg, Kaj O., 4,231,875, Cl. 210-232.000.
Carlsson, Per-Olov A. V.; and Stenberg, Kaj O., 4,231,880, Cl. 210-321.00B.
Gambro Dialysatoren GmbH & Co. KG: *See—*
Spranger, Kurt, 4,231,879, Cl. 210-321.00B.
Gangulee, Amitava: *See—*
Cuomo, Jerome J.; Gangulee, Amitava; and Kobliska, John, 4,231,816, Cl. 148-31.550.
Gantec Corporation: *See—*
Gantz, William A.; and Gantz, David M., 4,232,075, Cl. 428-124.000.
Gantz, David M.: *See—*
Gantz, William A.; and Gantz, David M., 4,232,075, Cl. 428-124.000.
Gantz, Jeanne A.; and Kelso, David W. Optical image multiplying device. 4,231,634, Cl. 350-4.200.
Gantz, William A.; and Gantz, David M., to Gantec Corporation. Plastic mirror article and method of making same. 4,232,075, Cl. 428-124.000.
Garcea, Giampaolo, to Alfa Romeo S.p.A. Timing variator for the timing system of a reciprocating internal combustion engine. 4,231,330, Cl. 123-90.150.
Garcia, Barbara A.: *See—*
Henrick, Clive A.; and Garcia, Barbara A., 4,231,953, Cl. 260-465.00D.
Gardiner, William J.: *See—*
Wrast, Richard E.; Gardiner, William J.; and Shedd, Francis A., 4,231,826, Cl. 156-138.000.
Garner, Lloyd L.; and Harris, Charles R., to Smith International, Inc. Straight hole insert drill bit. 4,231,438, Cl. 175-353.000.
Garsky, Victor M., to American Home Products Corporation. Pentapeptides with analgesic activity on peripheral administration. 4,231,925, Cl. 260-112.50R.
Gates Rubber Company, The: *See—*
Wrast, Richard E.; Gardiner, William J.; and Shedd, Francis A., 4,231,826, Cl. 156-138.000.
Gatti, Alfonso: *See—*
Calmanti, Giulio; Gafa, Salvatore; Dadea, Giovanni M.; Gatti, Alfonso; and Burzio, Fulvio, 4,231,841, Cl. 162-5.000.
Gawronski, Michael J.; and Goldie, Harry, to United States of America, Air Force. High power microwave integrated circuit receiver protector with integral sensitivity time control. 4,232,278, Cl. 333-13.000.
Gaylord Regethermic Canada Ltd.: *See—*
Boudreault, Jean-Pierre, 4,231,490, Cl. 220-354.000.
Gayman, Charles. Closure lock-prop. 4,231,599, Cl. 292-339.000.
Gazdik, Charles E.; and McBride, Donald G., to International Business Machines Corporation. Electronic package assembly method. 4,231,154, Cl. 29-840.000.
Gebhardt, James L.; and Hutchins, Ferris L., Jr., to Mead Corporation, The. Merchandising display. 4,231,299, Cl. 108-91.000.
Gebhardt, James L., to Mead Corporation, The. Apparatus and method for forming an elongated structural element from plastic material and for applying a decorative film thereto. 4,231,831, Cl. 156-233.000.
Geesen, Donald H., to PPG Industries Canada Ltd. Method of concentrating an aqueous solution by multiple effect evaporating. 4,231,840, Cl. 159-47.00R.
General Electric Company: *See—*
Ashley, ugene, 4,231,282, Cl. 89-7.000.
Bochan, John, 4,231,237, Cl. 68-23.700.
Corrigan, Francis R., 4,231,980, Cl. 264-84.000.
DeVries, Robert C.; Lee, Minyoung; Szala, Lawrence E.; and Tuft, Roy E., 4,231,195, Cl. 51-307.000.
Humphrey, James S., Jr., 4,232,088, Cl. 428-412.000.
Kelly, Peter B., 4,231,573, Cl. 273-51.000.
Mark, Victor; and Hedges, Charles V., 4,231,920, Cl. 260-45.70S.
McMillan, Stephen L., 4,231,166, Cl. 34-48.000.
Peil, William, 4,232,252, Cl. 315-92.000.
Vakil, Himanshu B.; and Silverstein, Seth D., 4,232,360, Cl. 362-294.000.
General Electric Company Limited, The: *See—*
Rigden, Sydney A. R., 4,232,243, Cl. 313-217.000.
General Industries, Inc.: *See—*
Grenier, Wilfred J., 4,231,542, Cl. 251-15.000.
General Mills, Inc.: *See—*
Blake, Jon R., 4,232,049, Cl. 426-572.000.
Blake, Jon R., 4,232,053, Cl. 426-616.000.
General Motors Corporation: *See—*
Fuehrer, Reece R., 4,231,455, Cl. 192-4.00A.
Fusinski, Richard E., 4,232,319, Cl. 343-703.000.
Hawk, Rufus L.; and Unterborn, Ralph D., 4,231,721, Cl. 417-413.000.
Johnston, William J., 4,231,342, Cl. 123-557.000.
Moriconi, Leonard E.; and Yoshida, Yoshitaka, 4,232,256, Cl. 318-292.000.
Palma, James D., 4,231,525, Cl. 239-585.000.
Van Slooten, Louis J., 4,231,267, Cl. 74-569.000.
Widdowson, Richard E.; and Atkinson, Ward J., 4,231,713, Cl. 417-222.000.
Yu, Ruey J., 4,231,902, Cl. 252-519.000.
General Signal Corporation: *See—*
Engelbrecht, Horst P.; and Johnson, Howard K., 4,231,974, Cl. 261-87.000.
General Steel Industries, Inc.: *See—*
Jackson, Keith L., 4,231,296, Cl. 105-136.000.
Gentex Corporation: *See—*
Aileo, Jackson A., 4,231,117, Cl. 2-6.000.
Georg Fischer Aktiengesellschaft: *See—*
Hofmann, Franz, 4,231,984, Cl. 264-256.000.
Wernli, Max, 4,231,415, Cl. 164-160.000.
Georgia Tech Research Institute: *See—*
Carstens, Marion R., 4,231,689, Cl. 406-155.000.
Gerard, Roger E. J., to Marconi Company Limited, The. Message signal scrambling apparatus. 4,232,193, Cl. 179-1.50R.
Gerber Scientific Instrument Company, The: *See—*
Logan, David J., 4,231,659, Cl. 355-132.000.
Gerlach, Albrecht; Holzmann, Dieter; Lindstedt, Guenter; and Burth, Rolf-Dieter, to ITT Industries, Inc. Remote control arrangement using pulse spacing modulator. 4,232,297, Cl. 340-168.00S.
Germain, Francis R.: *See—*
Caron, Roger L.; Clifford, Peter J.; and Germain, Francis R., 4,232,380, Cl. 367-88.000.
Gesellschaft zur Forderung der Forschung an der Eidgenossischen Technischen Hochschule: *See—*
Bischoff, Klaus; and Stratton, Richard W., 4,231,976, Cl. 264-0.500.

Gewerkschaft Eisenhutte Westfalia: *See*—
Rosenberg, Harry; and Plevak, Lubomir, 4,231,685, Cl. 405-296.000.

Ghering, Walter L.: *See*—
Boll, Richard H., deceased; and Ghering, Walter L., 4,231,262, Cl. 73-861.040.

Ghosh, Anil C.: *See*—
Razdan, Raj K.; and Ghosh, Anil C., 4,232,028, Cl. 424-260.000.

Gibbons, Gladys M., executrix: *See*—
Gibbons, Harold M., deceased, 4,231,398, Cl. 137-615.000.

Gibbons, Harold M., deceased (by Gibbons, Gladys M., executrix), to FMC Corporation. Cargo hose to marine tanker connection apparatus. 4,231,398, Cl. 137-615.000.

Gibbs, Dale S.; Benson, Jack H.; and Fernandez, Reet T., to Dow Chemical Company, The. Dispersible vinylidene chloride polymer microgel powders as additives for urethane polymer foam. 4,232,129, Cl. 521-137.000.

Gibson, Harry: *See*—
Eccles, Edward S.; and Gibson, Harry, 4,232,312, Cl. 340-753.000.

Gibson, Robert C.; and Korenko, Michael K., to United States of America, Energy. High weldability nickel-base superalloy. 4,231,795, Cl. 75-171.000.

Gier, Thurman E., to Du Pont de Nemours, E. I., and Company. Method for flux growth of $KTiOPO_4$ and its analogues. 4,231,838, Cl. 156-600.000.

Giersberg, Dieter, to Siemens Aktiengesellschaft. Circuit arrangement for receiving simplex and duplex current telegraph characters. 4,232,188, Cl. 370-24.000.

Gilbers, Gabriele: *See*—
Neidig, Arno; Popp, Gerhard; and Gilbers, Gabriele, 4,232,326, Cl. 357-23.000.

Gilman, Paul B., Jr.; Belly, Robert T.; Koszelak, Thaddeus D.; and Zigman, Seymour, to Eastman Kodak Company. Process for selecting methine dyes which inhibit cell growth. 4,232,121, Cl. 435-32.000.

Gilpatric, Donald S. Apparatus for growing oysters and other molluscs. 4,231,322, Cl. 119-4.000.

Gilson, Channing W. Food dispensing utensil. 4,231,496, Cl. 222-414.000.

Giorgetti, Maurizio, to ATEX/U.S.A., Inc. Ink composition for non woven fabrics of synthetic fibers. 4,231,906, Cl. 260-19.00N.

Girard, Donald J.: *See*—
Paugstat, John F.; and Girard, Donald J., 4,232,375, Cl. 364-900.000.

Girling Limited: *See*—
Edwards, Roy E.; Price, Anthony G.; and Rees, John R., 4,231,224, Cl. 60-581.000.

Gislaved AB: *See*—
Ljungqvist, Stig-Ove E.; Hammarstrom, Bernth S.; and Fritjofsson, Sture F. E., 4,231,836, Cl. 156-405.00P.

Giulio, Ugo: *See*—
Mengoli, Giuliano; Daolio, Sergio; Giulio, Ugo; and Folonari, Carlo, 4,231,851, Cl. 204-181.00R.

Glass, Charles A.: *See*—
Walker, Maurice; Wheeley, Buren R.; and Glass, Charles A., 4,231,209, Cl. 53-48.000.

Gleichner, Hans, to Schneider Medintag AG. Clinically usable pump apparatus for a dilatation device. 4,231,715, Cl. 417-307.000.

Glesser, Louis S. Blade sharpener. 4,231,194, Cl. 51-211.00R.

Global Marine, Inc.: *See*—
Person, Abraham, 4,231,312, Cl. 114-264.000.

Glotzbach, Warren P.: *See*—
Dworsky, Lawrence N.; Whalin, Jeffery A.; and Glotzbach, Warren P., 4,232,239, Cl. 310-312.000.

Gnieser, Jurgen: *See*—
Mona, Roberto; and Gnieser, Jurgen, 4,231,862, Cl. 210-601.000.

Godard, Pierre: *See*—
Lelaidier, Daniel; and Godard, Pierre, 4,232,305, Cl. 340-384.00E.

Goddard, Denis A., to Beloit Corporation. Method of and means for precision mounting of members on elongate metallic supporting structure. 4,232,092, Cl. 428-542.000.

Goldberg, Bennett C.: *See*—
Campanella, Matthew J.; Maladra, Anthony; and Goldberg, Bennett C., 4,231,511, Cl. 235-375.000.

Goldie, Harry: *See*—
Gawronski, Michael J.; and Goldie, Harry, 4,232,278, Cl. 333-13.000.

Goldstein, Gideon, to Ortho Pharmaceutical Corporation. Tetrapeptides and methods. 4,232,008, Cl. 424-177.000.

Gomez, Nicolas Q.; and Martin, Raul. Method and components for construction of building from concrete slabs. 4,231,199, Cl. 52-91.000.

Goode, David P. Window mount ski rack. 4,231,501, Cl. 224-42.46R.

Goodrich, Charles B.: *See*—
Tundermann, John H.; and Goodrich, Charles B., 4,231,729, Cl. 425-79.000.

Goodyear Tire & Rubber Company, The: *See*—
Kelly, Walter J., 4,232,180, Cl. 585-645.000.
Vannan, Frederick F., Jr., 4,231,410, Cl. 152-356.00R.

Gopal, Raj: *See*—
Graham, Kingsley F.; and Gopal, Raj, 4,232,224, Cl. 250-356.000.

Gopalakrishnan, Sankaraiyer; and Kuivinen, William L., to Borg-Warner Corporation. Two-stage turbo compressor. 4,231,702, Cl. 415-56.000.

Gordon, James R. Conveyor skirtboard apron. 4,231,471, Cl. 198-836.000.

Gordon, Richard S.: *See*—
Siemer, Sidney R.; Gordon, Richard S.; and Nickell, Louis G., 4,231,788, Cl. 71-113.000.

Gorenc, Edward J.; Fox, Ulles E.; and Lesko, Imre A. Crimping tool for tubular-like objects and method. 4,231,246, Cl. 72-412.000.

Gorman, Esther M.: *See*—
Gorman, William W., Jr.; and Gorman, Esther M., 4,231,992, Cl. 422-258.000.

Gorman, William W., Jr.; and Gorman, Esther M., to E-C Apparatus Corporation. Three-phase counter-double-current apparatus. 4,231,992, Cl. 422-258.000.

Gorski, Michael E.: *See*—
Prickett, William H., 4,231,654, Cl. 355-38.000.

Gould Inc.: *See*—
DeLacy, James P.; and Lechner, Robert H., 4,232,232, Cl. 307-139.000.
Luke, Roger D.; and Rhodes, John M., 4,231,633, Cl. 339-242.000.
Menocal, Gustavo A., 4,232,282, Cl. 335-202.000.

Gould, Larrie A.; and Reed, Kim W., to Motorola, Inc. Radio receiver alignment indicator. 4,232,398, Cl. 455-226.000.

Goyette, William J.: *See*—
Kiovsky, Joseph R.; and Goyette, William J., 4,232,181, Cl. 585-739.000.

Graham, Alan A.: *See*—
Stetson, John R.; Graham, Alan A.; and Frisch, Rudolf, 4,232,076, Cl. 428-158.000.

Graham, Kingsley F.; and Gopal, Raj, to Westinghouse Electric Corp. Nuclear reactor primary coolant loop flowmeter with phase shift tracking compensation. 4,232,224, Cl. 250-356.000.

Graham, Paul W. L.; and Moore, Thomas W., Jr., to Owens-Illinois, Inc. Method of strengthening glass articles. 4,231,778, Cl. 65-117.000.

Grandfils, Pierre: *See*—
Blanpain, Guy; and Grandfils, Pierre, 4,231,672, Cl. 403-62.000.

Granier, Pierre: *See*—
Narbaits-Jaureguy, Jean-Raymond; Billottet, Henri; and Granier, Pierre, 4,232,285, Cl. 340-38.00L.

Grant, Andrew C.; and Kern, James W., to Union Carbide Corporation. Thermospray method for production of aluminum porous boiling surfaces. 4,232,056, Cl. 427-37.000.

Gratzer, Nelson R.; and Wright, William E., to Carrier Corporation. Refrigerant accumulator and method of manufacture thereof. 4,231,230, Cl. 62-503.000.

Grau, Thomas G.: *See*—
Emo, George C.; and Grau, Thomas G., 4,232,262, Cl. 324-65.00P.

Greenbaum, George. Agricultural device having air-water-soil strata. 4,231,187, Cl. 47-80.000.

Greenwood, David L. Syringe adaptor assembly. 4,231,494, Cl. 222-325.000.

Greive, Aloys, to Hamel GmbH, Zwirnmaschinen. Drive system for a yarn eye or yarn winder. 4,231,531, Cl. 242-18.100.

Grenier, Wilfred J., to General Industries, Inc. Automatically resetting flush valve. 4,231,542, Cl. 251-15.000.

Gresens, Harry; and Schuierer, Manfred, to Bruckner Apparatebau GmbH. Process for heat-treating a fabric web. 4,231,165, Cl. 34-28.000.

Gresser, Gerhard: *See*—
Nicklas, Walter; Hesler, Dietrich; and Gresser, Gerhard, 4,232,064, Cl. 427-208.400.

Greutert, Albert: *See*—
Zimmermann, Anton; and Greutert, Albert, 4,231,876, Cl. 210-232.000.

Grey, Roger A.; and Pez, Guido P., to Allied Chemical Corporation. Process for homogeneous hydrogenation of esters. 4,232,170, Cl. 560-179.000.

Griehl, Wolfgang: *See*—
Schmid, Eduard; and Griehl, Wolfgang, 4,232,145, Cl. 528-324.000.

Griepentrog, Hartmut, to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft. Method and apparatus for vaporizing liquid natural gases. 4,231,226, Cl. 60-648.000.

Griffith Laboratories U.S.A., Inc.: *See*—
Sair, Louis; and Sair, Ralph A., 4,232,047, Cl. 426-96.000.

Griffiths, David T., to Youngflex S.A. Seat frames. 4,231,615, Cl. 297-452.000.

Grigo, Ulrich; Merten, Josef; and Binsack, Rudolf, to Bayer Aktiengesellschaft. Elastomeric thermoplastic mixtures of polypropylene and ethylene/vinyl acetate copolymers. 4,232,132, Cl. 525-222.000.

Grimes, Arnold S. Television channel lock-out apparatus. 4,232,396, Cl. 455-179.000.

Grimes, Jerry L. Gas delivery face shield. 4,231,363, Cl. 128-205.250.

Grimm, Herbert: *See*—
Rosbiegalle, Rudolf; Farber, Karl; Grimm, Herbert; Schmeisser, Helmut; Schonhut, Hermann; Krumnikl, Svatopluk; and Edel, Gunter, 4,231,669, Cl. 401-258.000.

Grimshaw, Rex W.; and Poole, Colin, to Hepworth & Grandage Limited. Composite materials and their production. 4,232,091, Cl. 428-472.000.

Grise, Ernest J., Jr., to Akzona Incorporated. Method and apparatus for alleviating tight spots in false twist textured yarn. 4,231,219, Cl. 57-290.000.

Griswold, Frank B. Instep protector for safety shoes. 4,231,170, Cl. 36-72.00R.

Groen, Johannes, to Holland Dental B.V. Apparatus for removably supporting at least one medical, particularly dental instrument, such as a dental drill or the like. 4,231,737, Cl. 433-78.000.

Gross, Jerome A. Interpenetrating nailable fastener for sheet metal. 4,231,280, Cl. 85-31.000.

Groth, Hugh F.; Vogel, John D.; and Hunt, Guilbert M., to Sherwin-Williams Company, The. Liquid power driven coating apparatus. 4,231,668, Cl. 401-146.000.

Grow Group Inc.: *See—*
Tsou, Ivan H., 4,231,907, Cl. 260-23.0AR.

Grumman Aerospace Corporation: *See—*
Haslett, Robert A., 4,231,423, Cl. 165-105.000.

Grumman Flexible Corporation: *See—*
Heffner, George R.; and Casutt, Max, 4,231,556, Cl. 269-22.000.

Grundmann, Raban: *See—*
Magiera, Leonhardt; Grundmann, Raban; and Krockenberger, Dieter, 4,231,968, Cl. 570-109.000.

Gruppo Lepetit S.p.A.: *See—*
Winters, Giorgio; and Di Mola, Nunzio, 4,232,017, Cl. 424-246.000.

Gsell, Laurenz: *See—*
Reinehr, Dieter; and Gsell, Laurenz, 4,231,962, Cl. 564-272.000.

GTE Lenkurt Electric (Canada) Ltd.: *See—*
Willoner, Gideon, 4,232,269, Cl. 330-85.000.

GTE Products Corporation: *See—*
Dow, Judith A.; and Fohl, Timothy, 4,232,058, Cl. 427-54.100.

Guerinault, Jean-Marc; and Barber, Jacques, to Saft-Societe des Accumulateurs Fixes et de Traction. Through-connector providing an electrical connection through a single or double plastic wall and application thereof to an electrical battery. 4,231,631, Cl. 339-94.00A.

Gugel, Georg, to Kraftwerk Union Aktiengesellschaft. Manipulator for inspection and possible repair of the tubes of heat exchangers, especially of steam generators for nuclear reactors. 4,231,419, Cl. 165-11.00A.

Guido, Anthony A.: *See—*
Weiss, Gerald; Scharf, Gerson; Guido, Anthony A.; and Lazardwitz, Benjamin, 4,232,187, Cl. 178-22.000.

Guillaume, Jacques: *See—*
Dumont, Claude; Guillaume, Jacques; and Nedelec, Lucien, 4,232,031, Cl. 424-263.000.

Gulf Oil Corporation: *See—*
Cahoy, Roger P., 4,232,163, Cl. 548-195.000.
Larson, Olaf A.; and Matthews, Charles W., 4,231,617, Cl. 299-2.000.

Gunther, Dieter; Erckel, Rudiger; Rosch, Gunter; and Probst, Heinz, to Hoechst Aktiengesellschaft. Mixtures of optical brighteners. 4,231,741, Cl. 8-571.000.

Gurvich, Yakov A.: *See—*
Adigamov, Engel R.; Gurvich, Yakov A.; Liakumovich, Alexandr G.; Logutov, Igor J.; Michurov, Jury I.; Polenov, Alexei S.; and Yanshevsky, Vladimir A., 4,232,176, Cl. 568-756.000.

Gutierrez, Manuel M., to Tosco Corporation. Method for separating carbon black from fiberglass. 4,231,998, Cl. 423-449.000.

H. C. Price Co.: *See—*
Hart, Milburn L.; and Bridge, John F., 4,231,823, Cl. 156-64.000.

Haberle, Fritz; Riechers, Daniel; and Heusel, Richard, to Daimler-Benz Aktiengesellschaft. Bumper for motor vehicles. 4,231,601, Cl. 293-136.000.

Hackl, Helmut: *See—*
Brabetz, Bernhard; and Hackl, Helmut, 4,231,692, Cl. 408-230.000.

Haderer, Norman G.; and Troy, J. Harold, to Westinghouse Electric Corp. Method and apparatus for manufacturing a filament served bondable conductor. 4,231,151, Cl. 29-605.000.

Haefliger, Walter: *See—*
Closse, Annemarie; Haefliger, Walter; and Hauser, Daniel, 4,232,039, Cl. 424-278.000.

Haferl, Peter E., to RCA Corporation. Regulated deflection circuit. 4,232,254, Cl. 315-408.000.

Hafner, Joseph A. Siding structure. 4,231,206, Cl. 52-529.000.

Hagen, Helmut; and Kohler, Rolf-Dieter, to BASF Aktiengesellschaft. 2-Substituted-1-alkyl-nitroimidazoles. 4,232,165, Cl. 548-339.000.

Hager, David P. Dog food container and feeder. 4,231,326, Cl. 119-52.00R.

Haginomori, Eiichi: *See—*
Menju, Shinichi; Takahashi, Kunio; Haginomori, Eiichi; Murakami, Yoichi; and Zaima, Eiichi, 4,231,258, Cl. 73-572.000.

Hahn, Reinhard; and Behrens, Dieter, to Hermann C. Starck Berlin. Process for the preparation of tantalum and niobium powders of improved efficiency. 4,231,790, Cl. 75-0.5BB.

Hainle, Rudi: *See—*
Alf, Herbert; Ernst, Volker; Hainle, Rudi; and Leipelt, Rudolf, 4,231,343, Cl. 123-556.000.

Hall, David E.: *See—*
Orr, Thomas S. C.; Hall, David E.; and Mann, John, 4,232,012, Cl. 424-232.000.

Hall, James F., Jr.; Lake, Ralph J., Jr.; and Scholder, William G., to Franklin Electric Subsidiaries, Inc. Automatic check weigher. 4,231,439, Cl. 177-25.000.

Hall, Wendel W.: *See—*
Duncan, Rodney A.; and Hall, Wendel W., 4,231,540, Cl. 248-487.000.

Hallberg, Irving H.; Paul, Howard C.; Ralston, Ronald R.; and Hunninghaus, Roy E., to Borg-Warner Corporation. Control system for regulating air/fuel ratio. 4,231,335, Cl. 123-440.000.

Halliburton Company: *See—*
Elphingstone, Eugene A.; and Norman, Lewis R., 4,231,882, Cl. 252-8.55C.

Hallstrom, Ulf: *See—*
Franzen, Olof K.; Hallstrom, Ulf; and Petersson, Bengt A., 4,232,096, Cl. 428-683.000.

Hamakawa, Toshihiro: *See—*
Kajihara, Motoyoshi; Hamakawa, Toshihiro; Shibata, Toshiaki; Suzue, Takashi; and Fujii, Setsuro, 4,232,007, Cl. 424-177.000.

Hamal, Heinrich: *See—*
Kuhne, Rudolf; and Hamal, Heinrich, 4,231,964, Cl. 564-305.000.

Hamamatsu Terebi Kabushiki Kaisha: *See—*
Hiruma, Teruo; and Tsuchiya, Yutaka, 4,232,333, Cl. 358-93.000.

Hamashima, Yoshio: *See—*
Nagata, Wataru; Hamashima, Yoshio; Tsuji, Teruji; and Lunn, William H. W., 4,232,151, Cl. 544-90.000.

Hamatani, Mitsuhiro, to Kabushiki Kaisha Seikosha. Electric circuit for driving a piezoelectric vibrator. 4,232,241, Cl. 310-317.000.

Hamel GmbH, Zwirnmaschinen: *See—*
Greive, Aloys, 4,231,531, Cl. 242-18.100.

Hammarstrom, Bernth S.: *See—*
Ljungqvist, Stig-Ove E.; Hammarstrom, Bernth S.; and Fritjofsson, Sture F. E., 4,231,836, Cl. 156-405.00P.

Hanajima, Hidemitsu; and Shigeta, Yasuo, to Sony Corporation. Digital signal selective circuit. 4,232,267, Cl. 328-138.000.

Hancart, Jules: *See—*
Paulus, Philippe; and Hancart, Jules, 4,231,812, Cl. 148-6.15R.

Hanisch, Horst; Winkelmann, Heinrich; and Fischer, Adolf, to Winkelmann and Pannhoff and Bayerische Motoren Werke Aktiengesellschaft. Tooth grip belt pulley. 4,231,265, Cl. 474-152.000.

Hanley, John P. Human reproduction indexing device. 4,232,215, Cl. 235-78.0RC.

Hannie, Steven G.; and Tucker, Terry D., to Parsons Manufacturing, Incorporated. Grain cleaning apparatus. 4,231,861, Cl. 209-240.000.

Hansen, Harold O.: *See—*
Hestad, Alfred M.; Synek, Jan; and Hansen, Harold O., 4,232,200, Cl. 179-90.00K.

Hanusiak, William M.: *See—*
White, Eugene W.; Hanusiak, William M.; and White, Rodney A., 4,231,979, Cl. 264-81.000.

Hara, Akio; and Yazu, Shuji, to Sumitomo Electric Industries, Ltd. Method of producing a sintered diamond compact. 4,231,762, Cl. 51-309.000.

Hara, Elmer H.; and Ozeki, Takeshi, to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Frequency division multiplexing system for optical transmission of broadband signals. 4,232,385, Cl. 370-3.000.

Hara, Katsumasa. Device for air-massage. 4,231,355, Cl. 128-24.200.

Harding, Allen W., to ABC Elevators, Inc. Elevator erection method. 4,231,148, Cl. 29-469.000.

Haren, Doyle V.: *See—*
Ensley, Rufus N.; Haren, Doyle V.; Logan, Arthur D.; and McLean, Michael E., 4,231,835, Cl. 156-361.000.

Harman, John N., III: *See—*
Chapman, Robert L.; and Harman, John N., III, 4,231,256, Cl. 73-421.50R.

Harms, Hauke: *See—*
Papp, Alfred; and Harms, Hauke, 4,232,264, Cl. 324-96.000.

Harnois, Georges A. Method and device for arranging a storage area. 4,231,201, Cl. 52-169.600.

Harris, Charles R.: *See—*
Garner, Lloyd L.; and Harris, Charles R., 4,231,438, Cl. 175-353.000.

Harris Corporation: *See—*
Leitch, Clifford D., 4,232,189, Cl. 179-1.00G.
Smiley, Charles F.; and Zachum, Billy G., 4,232,339, Cl. 358-150.000.

Harris, Harold H., to Northern Telecom Limited. Line interface unit for voice and wide band signal coupling. 4,232,293, Cl. 340-147.00R.

Harrom, Harley A.: *See—*
Hedtke, Robert G.; Harrom, Harley A.; Kelley, Wilfred H., Jr.; and Frederick, Sherman B., 4,231,450, Cl. 187-9.00R.

Harshberger, Robert P., Jr., to Ampex Corporation. Web transport capstan control system. 4,232,257, Cl. 318-314.000.

Hart, Milburn L.; and Bridge, John F., to H. C. Price Co. Method and apparatus for centering two concentric cylinders. 4,231 823, Cl. 156-64.000.

Hart, Robert A.: *See—*
Carlberg, Bob L.; and Hart, Robert A., 4,231,869, Cl. 210-763.000.

Hartman, Adrian R.; Riley, Terence J.; and Shackle, Peter W., to Bell Telephone Laboratories, Incorporated. Dielectrically-isolated integrated circuit complementary transistors for high voltage use. 4,232,328, Cl. 357-49.000.

Hartzler, Harold E., to Miles Laboratories, Inc. 2,5-Dioxo-3H,6H-furo[(3,2-b]furan-3a,6a-diacetic acid and salts thereof. 4,231,939, Cl. 260-343.600.

Hasegawa, Gary K., to Continental Group, Inc., The. Pull tab having memory for effecting rolling up of tab and removable panel portion. 4,231,487, Cl. 220-269.000.

Hashimoto, Shinsuke: *See—*
Hayashi, Masaki; Arai, Yoshinobu; Ohuchida, Shuichi; and Hashimoto, Shinsuke, 4,232,009, Cl. 424-180.000.

Haskett, William F.: *See—*
Boatwright, John T.; Prince, David G.; Haskett, William F.; and Koch, Helmut, 4,232,199, Cl. 179-18.00B.

Haski, Andre L.; and Bleys, Cyriacus A., to Haski, said Andre L., by said Cyriacus A. Bleys. Rate measuring device for joint and/or muscular performance. 4,231,255, Cl. 73-379.000.

Haski, said Andre L.: *See—*
Haski, Andre L.; and Bleys, Cyriacus A. (said Cyriacus A. Bleys assors. to), 4,231,255, Cl. 73-379.000.

Haslett, Robert A., to Grumman Aerospace Corporation. Heat pipe panel and method of fabrication. 4,231,423, Cl. 165-105.000.

Hatanaka, Takefumi. Automatic document shredder. 4,231,530, Cl. 241-223.000.

Hatsuno, Hiroshi; Fukazawa, Jinpei; Fukushima, Mitsuo; and Ogawa, Shinji, to Ricoh Company, Ltd. Apparatus for sensing Schnarren phenomenon in fuel injection line. 4,231,251, Cl. 73-119.00A.

Hatsushika, Masabumi: *See*—
Takeuchi, Yo; Ohbori, Koichi; Hatsushika, Masabumi; and Komori, Shinichi, 4,231,817, Cl. 148-32.500.

Hattori, Seizi; Makino, Koichi; Nakagawa, Takehiko; and Shinohara, Masayoshi, to Fujitsu Limited. Magnetic recording medium and process for producing the same. 4,232,061, Cl. 427-130.000.

Hattori, Seizi: *See*—
Terada, Akira; Hattori, Seizi; Ishii, Yoshikazu; Nohara, Akira; Inagaki, Nobuo; Matsuda, Wrkatake; and Kawakami, Susumu, 4,232,071, Cl. 428-64.000.

Hattori, Shuzo: *See*—
Tokudome, Katumi; Ishikawa, Michio; and Hattori, Shuzo, 4,232,274, Cl. 331-94.50S.

Hausenblas, Bernhard: *See*—
Merkle, Theodor; Hausenblas, Bernhard; Schweickert, Hermann; and Wengert, Dieter, 4,231,594, Cl. 285-3.000.

Hauser, Daniel: *See*—
Closse, Annemarie; Haefliger, Walter; and Hauser, Daniel, 4,232,039, Cl. 424-278.000.

Havlice, James F.: *See*—
Waxman, Albert S.; and Havlice, James F., 4,231,373, Cl. 128-660.000.

Hawk, Rufus L.; and Unterborn, Ralph D., to General Motors Corporation. Diaphragm pump. 4,231,721, Cl. 417-413.000.

Hawken, Henry A.: *See*—
Phelon, Russell E.; and Hawken, Henry A., 4,232,284, Cl. 336-90.000.

Hayama, Hajime: *See*—
Kanatani, Heiichi; Osumi, Masato; and Hayama, Hajime, 4,231,353, Cl. 126-443.000.

Hayashi, Masaki; Arai, Yoshinobu; Ohuchida, Shuichi; and Hashimoto, Shinsuke, to ONO Pharmaceutical Co. Ltd. ω-Halo-PGI$_2$ analogues. 4,232,009, Cl. 424-180.000.

Haydon, Charles R. Dent straightening tool. 4,231,247, Cl. 72-479.000.

Hayes, Roger A.: *See*—
Flock, Steven D.; and Hayes, Roger A., 4,231,664, Cl. 366-35.000.

Hayes, William H., Jr.: *See*—
Lyon, Warren C.; and Hayes, William H., Jr., 4,231,376, Cl. 128-748.000.

Hebble, Terry L.: *See*—
Sandberg, Richard G.; and Hebble, Terry L., 4,231,993, Cl. 423-34.000.

Hechtfischer, Gustav: *See*—
Satzinger, Gerhard; Herrmann, Manfred F.; and Hechtfischer, Gustav, 4,231,933, Cl. 260-326.5FL.

Hedges, Charles V.: *See*—
Mark, Victor; and Hedges, Charles V., 4,231,920, Cl. 260-45.70S.

Hedstrom Co.: *See*—
Moss, Mark D., 4,231,582, Cl. 280-87.02W.

Hedtke, Robert G.; Harrom, Harley A.; Kelley, Wilfred H., Jr.; and Frederick, Sherman B., to White Farm Equipment Company. Overload warning system. 4,231,450, Cl. 187-9.00R.

Heerema, Pieter S.; Horowitz, Alexandre; and Willemsen, Henricus P., to Varitrac AG. Stabilizing system on a semi-submersible crane vessel. 4,231,313, Cl. 114-265.000.

Heeres, Jan; Backx, Leo J. J.; and Mostmans, Joseph H., to Janssen Pharmaceutica, N.V. Heterocyclic derivatives of 1-(1,3-dioxolan-2-ylmethyl)-1H-imidazoles. 4,232,034, Cl. 424-269.000.

Heffner, George R.; and Casutt, Max, to Grumman Flexible Corporation. Apparatus for holding hollow wall panels while they are filled with foamed plastic. 4,231,556, Cl. 269-22.000.

Hehl, Klaus; and Sauer, Hans-Jurgen, to Riloga-Werk Joachim Schmidt. Roller-blind assembly. 4,231,411, Cl. 160-120.000.

Heikinheimo, Olli, to Plan-Sell Oy. System for transferring wane-edged boards. 4,231,460, Cl. 198-341.000.

Heiligtag, Raymond W. Gyratory aerobic aeration treatment tank. 4,231,874, Cl. 210-195.400.

Heimerman, David P.: *See*—
Hinds, Horace, Jr.; Heimerman, David P.; and Born, Billy L., 4,232,051, Cl. 426-582.000.

Heinsen, Edward A.; and Marathe, Vijay V., to Hewlett-Packard Company. Incrementing signal hold circuit for a clock/calculator. 4,232,382, Cl. 368-1.000.

Heinz Kaiser AG: *See*—
Pape, Dieter; and Woerz, Hans, 4,231,691, Cl. 408-185.000.

Heiter, George L., to Bell Telephone Laboratories, Incorporated. Continuously variable phase shift network. 4,232,399, Cl. 455-276.000.

Heitmann, Jurgen, to Robert Bosch GmbH. Method and system for separating the chrominance and luminance signals in color television signals having quadrature-modulated chrominance subcarriers. 4,232,330, Cl. 358-31.000.

Helle, Michel, to Compagnie Internationale pour l'Informatique CII-Honeywell Bull (Societe Anonyme). Method and device for reading coded information in the form of intervals of predetermined sizes. 4,232,216, Cl. 235-449.000.

Hempelmann, Heinrich J.: *See*—
Beisch, Hans R.; and Hempelmann, Heinrich J., 4,231,619, Cl. 301-37.00P.

Henderson, Dennis. Method and apparatus for assembling a portable tower. 4,231,200, Cl. 52-111.000.

Henderson, James M.: *See*—
Campbell, Ivor E.; Henderson, James M.; Johnson, Walter; and Wetherill, William H., 4,231,995, Cl. 423-242.000.

Henke, Robert H., to Allegheny Ludlum Industries, Inc. Methods of producing silicon steel strip. 4,231,818, Cl. 148-111.000.

Henrick, Clive A.; and Garcia, Barbara A., to Zoecon Corporation. Fluoro substituted aryl esters and thiolesters of amino acids. 4,231,953, Cl. 260-465.00D.

Henry, James W., to Eastman Kodak Company. Inspection of elongated material. 4,232,336, Cl. 358-106.000.

Henry, William N., to RCA Corporation. Method of making a silicon diode array target. 4,231,820, Cl. 148-187.000.

Henry, William P., to Caterpillar Tractor Co. Fluid barrier means for parts washer apparatus. 4,231,806, Cl. 134-18.000.

Hepp, Dieter: *See*—
Kaufhold, Manfred; Hepp, Dieter; and Menzel, Gerhard, 4,231,915, Cl. 260-31.80R.

Hepworth & Grandage Limited: *See*—
Grimshaw, Rex W.; and Poole, Colin, 4,232,091, Cl. 428-472.000.

Herman Miller, Inc.: *See*—
Propst, Robert L.; and Wodka, Michael A., 4,231,630, Cl. 339-22.00R.

Hermann C. Starck Berlin: *See*—
Hahn, Reinhard; and Behrens, Dieter, 4,231,790, Cl. 75-0.5BB.

Hermine, Mair, to Ipierre Sirotex, S.p.A. Water sprinkler. 4,231,521, Cl. 239-230.000.

Herrmann, Manfred F.: *See*—
Satzinger, Gerhard; Herrmann, Manfred F.; and Hechtfischer, Gustav, 4,231,933, Cl. 260-326.5FL.

Hertell, Siegfried, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Rotary vane pump. 4,231,728, Cl. 418-79.000.

Hertzog, Russel C., to Schlumberger Technology Corporation. Background subtraction system for pulsed neutron logging of earth boreholes. 4,232,220, Cl. 250-270.000.

Herzer, Heinz; Rath, Heinz-Jorg; and Schmidt, Dietrich, to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH. Process for purifying solid substances. 4,231,755, Cl. 23-293.00R.

Hesler, Dietrich: *See*—
Nicklas, Walter; Hesler, Dietrich; and Gresser, Gerhard, 4,232,064, Cl. 427-208.400.

Hessner, Hans, to Mo Och Domsjo Aktiebolag. Bandage for absorbing body fluids. 4,231,357, Cl. 128-156.000.

Hestad, Alfred M.; Synek, Jan; and Hansen, Harold O., to United Networks, Inc. Dialing system. 4,232,200, Cl. 179-90.00K.

Heusel, Richard: *See*—
Haberle, Fritz; Riechers, Daniel; and Heusel, Richard, 4,231,601, Cl. 293-136.000.

Heuser, Hans: *See*—
Orain, Roger; Heuser, Hans; Ohlenforst, Hans; and Pelzer, Rudolf, 4,232,080, Cl. 428-215.000.

Hewett, Colin L.: *See*—
Campbell, Alexander C.; Hewett, Colin L.; and Zeelen, Filippus J., 4,232,042, Cl. 424-308.000.

Hewitt, James A., to F. W. Payne & Son (Bickley) Limited. Floating dredger and treatment plant. 4,231,172, Cl. 37-71.000.

Hewlett-Packard Company: *See*—
Clouser, David E.; and Engel, Steven J., 4,232,233, Cl. 307-229.000.
Heinsen, Edward A.; and Marathe, Vijay V., 4,232,382, Cl. 368-1.000.

Heybourn, Frank: *See*—
Hinchcliffe, Dennis; Heybourn, Frank; and Luddington, Eric A., 4,231,461, Cl. 198-347.000.

Hickam, William M.; Lin, Ching-Yu; and Zomp, John M., to Westinghouse Electric Corp. Combined O_2/combustibles solid electrolyte gas monitoring device. 4,231,733, Cl. 431-76.000.

Hida, Tetsuo: *See*—
Fujiu, Masayoshi; and Hida, Tetsuo, 4,231,303, Cl. 110-245.000.

Higuchi, Hobart A.; and Yee, Sammy K., to International Business Machines Corporation. AC to DC Converter with enhanced buck-/boost regulation. 4,232,363, Cl. 363-75.000.

Higuchi, Noboru; Ogasawara, Takayuki; and Seike, Shoji, to NGK Insulators, Ltd. Electrical insulator with semiconductive glaze. 4,232,185, Cl. 174-140.00C.

Hill, Johnnie L. Automobile auxiliary heater. 4,232,211, Cl. 219-202.000.

Hill, Lewis J.; and Dillard, Bill J., to U-Change Lock Industries, Inc. Plug for a key operated lock. 4,231,242, Cl. 70-347.000.

Hill, William F.; and Southgate, John P., to Lucas Industries Limited. Internal combustion engine function control system. 4,232,368, Cl. 364-431.000.

Hillesland, Gene G. Combination tail-wiggling artificial bait and stabilizer plug. 4,231,179, Cl. 43-42.060.

Hinchcliffe, Dennis; Heybourn, Frank; and Luddington, Eric A., to Molins, Ltd. Reservoirs for cigarettes. 4,231,461, Cl. 198-347.000.

Hindermayr, Herman: *See*—
Winter, Werner; Hindermayr, Herman; Roesch, Egon; Roesch, Androniki; and Wilhelms, Otto-Henning, 4,232,024, Cl. 424-251.000.

Hinds, Horace, Jr.; Heimerman, David P.; and Born, Billy L., to Stoelting, Inc. Method of separating liquid from soft particulate food solids. 4,232,051, Cl. 426-582.000.

Hinn, Werner, to RCA Corporation. SECAM Chroma demodulator circuit. 4,232,268, Cl. 329-103.000.

Hirai, Kentaro; Fujishita, Toshio; and Ishiba, Teruyuki, to Shionogi & Co., Ltd. 1-Substituted thiomethyltriazolobenzodiazepines. 4,231,930, Cl. 260-245.500.
Hirai, Seiichi: *See*—
Otsuka, Nobuyuki; and Hirai, Seiichi, 4,231,232, Cl. 64-21.000.
Hirose, Takao: *See*—
Kato, Osamu; Uemura, Seiichi; Yamamoto, Syunichi; Hirose, Takao; and Takashima, Hiroaki, 4,231,857, Cl. 208-40.000.
Hirsch, Horst E.; and Smyth, Robert W., to Cominco Ltd. Cadmium mercury telluride sputtering targets. 4,231,981, Cl. 264-102.000.
Hiruma, Teruo; and Tsuchiya, Yutaka, to Hamamatsu Terebi Kabushiki Kaisha. Streak image analyzing device. 4,232,333, Cl. 358-93.000.
Hitachi, Ltd.: *See*—
Kuwahara, Akiyasu; and Yanagisawa, Syozo, 4,231,337, Cl. 123-568.000.
Murata, Toshinori; and Matsuura, Shigeo, 4,232,397, Cl. 455-179.000.
Nishimiya, Torazo; Okumura, Masamitsu; Ito, Tomo; and Numakura, Seisaku, 4,231,340, Cl. 123-568.000.
Okuhara, Shinzi; Ohhinata, Ichiro; and Tokunaga, Michio, 4,232,234, Cl. 307-252.00G.
Saito, Akihiro; and Naoi, Keigo, 4,232,238, Cl. 310-68.00D.
Sakamoto, Masakatsu; Uchida, Kenji; and Kamino, Yukishige, 4,231,686, Cl. 406-14.000.
Sakurai, Soichi; Ando, Kunio; and Fukuzawa, Kenichi, 4,232,246, Cl. 313-414.000.
Tobita, Hideyuki; and Mori, Toshio, 4,231,130, Cl. 8-159.000.
Tooyama, Eiji, 4,232,206, Cl. 179-175.30S.
Ueda, Shinjiro; Takada, Yoshihiro; Mishina, Haruo; and Kuroda, Atsuhiko, 4,231,706, Cl. 416-186.00R.
Watanabe, Ryuji; Arakawa, Hideo; and Kuniya, Keiichi, 4,231,814, Cl. 148-11.5QC.
Yamamoto, Hideaki; Tsukada, Toshihisa; Maruyama, Eiichi; and Inagaki, Hiroya, 4,232,219, Cl. 250-227.000.
Hitachi Metals, Ltd.: *See*—
Asanae, Masumi; and Yamashita, Keitaro, 4,231,320, Cl. 118-657.000.
Hittman Corporation: *See*—
Lyon, Warren C.; and Hayes, William H., Jr., 4,231,376, Cl. 128-748.000.
Hobbs, Lawrence H.: *See*—
Baraff, David R.; and Hobbs, Lawrence H., 4,232,212, Cl. 219-216.000.
Hoch, Samuel: *See*—
Ceprini, Mario Q.; Collins, John D.; Hoch, Samuel; and Wood, Donald A., 4,231,949, Cl. 260-429.700.
Hochberg, Mordecai. Plant growing assembly. 4,231,189, Cl. 47-83.000.
Hochiki Corporation: *See*—
Yasuda, Katsuya; and Adachi, Akio, 4,232,292, Cl. 340-147.0SY.
Hochrein, Ambrose A., Jr.: *See*—
Thiruvengadam, Alagu P.; and Hochrein, Ambrose A., Jr., 4,231,259, Cl. 73-584.000.
Hochstein, Peter A.: *See*—
Pringle, William L.; Hochstein, Peter A.; and Milton, Harold W., Jr., 4,231,223, Cl. 60-527.000.
Hodgdon, Russell B.; and Alexander, Samuel S., to Ionics, Incorporated. Electrodialysis membranes of high interstitial molality based upon methacrylate ester derivatives. 4,231,855, Cl. 204-301.000.
Hodgkins, Bernard E.; and Wadey, Raymond C. C., to Zimmer Orthopaedic Limited. Supporting frame for a vehicle seat. 4,231,589, Cl. 280-781.000.
Hoechst Aktiengesellschaft: *See*—
De Felice, Wilfried, 4,231,477, Cl. 206-532.000.
Feess, Erich; and Reinhardt, Friedrich, 4,231,745, Cl. 8-552.000.
Gunther, Dieter; Erckel, Rudiger; Rosch, Gunter; and Probst, Heinz, 4,231,741, Cl. 8-571.000.
Kuhne, Rudolf; and Hamal, Heinrich, 4,231,964, Cl. 564-305.000.
Michel, Wolfgang; and Kalberer, Heinz, 4,232,128, Cl. 521-134.000.
Rochlitz, Jurgen; and Schon, Gunter, 4,231,799, Cl. 430-59.000.
Hoffman, Carl H.: *See*—
Monaghan, Richard L.; Alberts, Alfred W.; Hoffman, Carl H.; and Albers-Schonberg, George, 4,231,938, Cl. 260-343.500.
Hoffmann, Herbert: *See*—
Ponsold, Kurt; Prousa, Richard; Oettel, Michael; Strecke, Joachim; and Hoffmann, Herbert, 4,231,946, Cl. 260-397.400.
Hoffmann-La Roche Inc.: *See*—
Chan, Ka-Kong; and Pawson, Beverly A., 4,231,944, Cl. 260-347.400.
Hofmann, Corris M.: *See*—
Fanshawe, William J.; Epstein, Joseph W.; Crawley, Lantz S.; Hofmann, Corris M.; and Safir, Sidney R., 4,231,935, Cl. 260-326.50B.
Hofmann, Franz, to Georg Fischer Aktiengesellschaft. Process for the production of molded phosphate bonded refractory articles. 4,231,984, Cl. 264-256.000.
Hogan, Lawrence R., to Cole-Parmer Instrument Company. Peristaltic pump. 4,231,725, Cl. 417-477.000.
Hoh, Thomas L.; and Relly, Robert H. Shim. 4,232,068, Cl. 428-43.000.
Hohki, Tetsuo: *See*—
Sakamoto, Seiya; Hohki, Tetsuo; and Saito, Isao, 4,232,344, Cl. 358-298.000.
Holbek, Gert A. E., to Munch, Erik. Table having an adjustable support and locking system for the top thereof. 4,231,297, Cl. 108-10.000.
Holder, John D.: *See*—
Clark, Grady W.; Holder, John D.; and Pasto, Arvid E., 4,231,796, Cl. 75-206.000.
Holland Dental B.V.: *See*—
Groen, Johannes, 4,231,737, Cl. 433-78.000.
Hollingsworth, Charles M.: *See*—
Corris, Charles J.; Hollingsworth, Charles M.; Kosicki, Witold W.; and Potter, Robert T., 4,231,184, Cl. 46-265.000.
Holset Engineering Company Limited: *See*—
Cornish, Robert N., 4,231,457, Cl. 192-82.00T.
Holt, John P.; and Cash, Theodore P., to Valley Mineral Products Corporation. Dry heat setting refractory and methods of using same. 4,231,800, Cl. 106-58.000.
Holzermer, Guenter: *See*—
Finkenzeller, Johann; Holzermer, Guenter; and Wenzek, Gerhard, 4,232,227, Cl. 250-468.000.
Holzmann, Dieter: *See*—
Gerlach, Albrecht; Holzmann, Dieter; Lindstedt, Guenter; and Burth, Rolf-Dieter, 4,232,297, Cl. 340-168.00S.
Honda Giken Kogyo Kabushiki Kaisha: *See*—
Otsuka, Nobuyuki; and Hirai, Seiichi, 4,231,232, Cl. 64-21.000.
Honeywell Inc.: *See*—
Bibbero, Robert J., 4,232,364, Cl. 364-105.000.
Hoogovens Ijmuiden, B.V.: *See*—
Vander, Timen; Thijssen, Nicolaas J.; de Blok, Jan F.; and Middel, Jan, 4,231,845, Cl. 202-113.000.
Hope Co., Ltd.: *See*—
Kikuchi, Toshikazu, 4,231,584, Cl. 280-604.000.
Hope, Henry F.; and Hope, Stephen F. Adjustable metering pump. 4,231,724, Cl. 417-472.000.
Hope, Stephen F.: *See*—
Hope, Henry F.; and Hope, Stephen F., 4,231,724, Cl. 417-472.000.
Horak, Jerry R.; Dillon, Peter L. P.; and Firth, Ronald R., to Eastman Kodak Company. Multichannel recording format for a sampled-analog color video signal. 4,232,329, Cl. 358-9.000.
Horbelt, Michael: *See*—
Drews, Ulrich; Schnurle, Hans; Horbelt, Michael; Schmidt, Bernhard; and Werner, Peter, 4,231,345, Cl. 123-510.000.
Horgan, Anthony M.; and Radler, Richard W., Jr., to Xerox Corporation. Imaging system. 4,232,102, Cl. 430-58.000.
Hori, Hideichi: *See*—
Nakane, Mototaka; and Hori, Hideichi, 4,231,456, Cl. 192-70.250.
Hori, Tatsu, to Savin Corporation. Recirculating document feeder. 4,231,562, Cl. 271-3.100.
Horiba, Ltd.: *See*—
Ohnishi, Toshikazu; Ishida, Kozo; and Saitoh, Osamu, 4,232,223, Cl. 250-343.000.
Horie, Ikutard: *See*—
Naoi, Takashi; and Horie, Ikutard, 4,232,117, Cl. 430-539.000.
Horikiri Spring Manufacturing Co., Ltd.: *See*—
Saito, Tsutomu, 4,231,555, Cl. 267-154.000.
Horowitz, Alexandre: *See*—
Heerema, Pieter S.; Horowitz, Alexandre; and Willemsen, Henricus P., 4,231,313, Cl. 114-265.000.
Horsman Dolls Inc.: *See*—
Corris, Charles J.; Hollingsworth, Charles M.; Kosicki, Witold W.; and Potter, Robert T., 4,231,184, Cl. 46-265.000.
Hoskinson, Gordon H., to Cornell-Hoskinson Manufacturing Corp. Combustion apparatus utilizing an auger having an integral air supply system. 4,231,304, Cl. 110-257.000.
Hosono, Takashi: *See*—
Toyama, Akira; Ohkoshi, Akio; Toyama, Takashi; Yukawa, Takahiro; and Hosono, Takashi, 4,232,332, Cl. 358-67.000.
Howarth, Thomas T., to Beecham Group Limited. Antibacterial agents. 4,232,005, Cl. 424-114.000.
Howmedica, Incorporated: *See*—
Kurtz, Robert J.; and Silverstein, Spencer J., 4,231,354, Cl. 128-1.00D.
Hrabal, Hans; and Wimmer, Josef, to Enfo Grundlagen Forschungs AG. Closing member for a ring valve. 4,231,394, Cl. 137-512.000.
Hsu, Sheng T., to RCA Corporation. Extended drain self-aligned silicon gate MOSFET. 4,232,327, Cl. 357-23.000.
Hsu, Yun T. Sparking plug with efficient air supplying system and a removable sitting device. 4,232,242, Cl. 313-120.000.
Hubert, Guy: *See*—
Dechenne, Roger; and Hubert, Guy, 4,231,483, Cl. 220-66.000.
Hudek, Karl; and Weigert, Kurt, to Siemens Aktiengesellschaft. Procedure and device for the detection of extraordinary events in a series of essentially periodically recurring normal events. 4,231,374, Cl. 128-702.000.
Huettner, Robert; Kuetterer, Gerhard; and Sklebitz, Hartmut, to Siemens Aktiengesellschaft. Diagnostic installation for producing tomographic images. 4,232,226, Cl. 250-445.00T.
Hughes Aircraft Company: *See*—
Forward, Robert L., 4,232,280, Cl. 333-213.000.
Kolb, William P., Jr., 4,232,275, Cl. 331-94.50D.
Lagodmos, George P., 4,231,418, Cl. 165-4.000.
Prince, Paul R., 4,232,279, Cl. 333-165.000.
Hughes, Donald W. K.; and Lauterbach, John H. F., to AMP Incorporated. Electrical connector receptacles. 4,231,628, Cl. 339-17.0LC.
Hugl, Herbert; and Wolfrum, Gerhard, to Bayer Aktiengesellschaft. Azo dyestuffs. 4,231,748, Cl. 8-668.000.
Huiatt, Jerry L.; Shurtz, Melvin D.; and Potter, George M., to United States of America, Interior. Molybdenite flotation. 4,231,859, Cl. 209-11.000.
Humphrey, James S., Jr., to General Electric Company. Polycarbonate articles coated with an adherent, durable organopolysiloxane coating and process for producing same. 4,232,088, Cl. 428-412.000.

Hunninghaus, Roy E.: *See—*
Hallberg, Irving H.; Paul, Howard C.; Ralston, Ronald R.; and Hunninghaus, Roy E., 4,231,335, Cl. 123-440.000.
Hunt, Guilbert M.: *See—*
Groth, Hugh F.; Vogel, John D.; and Hunt, Guilbert M., 4,231,668, Cl. 401-146.000.
Huntington Alloys Inc.: *See—*
Tundermann, John H.; and Goodrich, Charles B., 4,231,729, Cl. 425-79.000.
Huppenthal, Frank J.: *See—*
Still, Robert C.; Huppenthal, Frank J.; Smith, Barbara J.; and Scotney, Gerald H., 4,231,389, Cl. 137-315.000.
Hurkett, Earl. Water bed wave generator. 4,231,126, Cl. 5-451.000.
Hutchins, Ferris L., Jr.: *See—*
Gebhardt, James L.; and Hutchins, Ferris L., Jr., 4,231,299, Cl. 108-91.000.
Hutchinson, John; and Whittaker, Graham, to Imperial Chemical Industries Limited. Process for the preparation of a perfluorinated cyclic ether. 4,231,849, Cl. 204-59.00F.
I.S.C. Smelting Ltd.: *See—*
Charles, James A., 4,231,791, Cl. 75-9.000.
Ichikawa, Junji; Takahashi, Yuji; and Saito, Jun, to Canon Kabushiki Kaisha. Paper feed device. 4,231,565, Cl. 271-105.000.
Ichinose, Isao: *See—*
Mori, Fumio; Ichinose, Isao; and Kunimoto, Go, 4,232,086, Cl. 428-341.000.
ICI Americas Inc.: *See—*
Ferrarini, L. James, Jr.; and Feltzin, Joseph, 4,232,133, Cl. 525-452.000.
Ideal Toy Corporation: *See—*
Lahr, Robert G., 4,231,183, Cl. 46-262.000.
Idelson, Elbert M., to Polaroid Corporation. Yellow azomethine dye developers. 4,231,950, Cl. 260-438.50R.
Ihara Chemical Industry Company, Limited: *See—*
Shinohara, Akira; Wada, Nobuhide; Tokunaga, Yukio; and Yazawa, Chihiro, 4,231,963, Cl. 564-443.000.
Iida, Haruki: *See—*
Nagahara, Yasumori; and Iida, Haruki, 4,231,653, Cl. 355-3.0FU.
Iida Kensetsu Kabushiki Kaisha: *See—*
Ijima, Takeshi, 4,231,680, Cl. 405-31.000.
Iida, Yozo, to Nippon Kogaku K.K. Camera which permits automatic focusing and manual focusing. 4,231,646, Cl. 354-195.000.
Iizuka, Haruhiko: *See—*
Sugasawa, Fukashi; and Iizuka, Haruhiko, 4,231,338, Cl. 123-568.000.
Iizuka, Yutaka: *See—*
Kimura, Makoto; and Iizuka, Yutaka, 4,231,649, Cl. 354-224.000.
Ijima, Takeshi, to Iida Kensetsu Kabushiki Kaisha. Breakwaters. 4,231,680, Cl. 405-31.000.
Ikarashi, Takeo: *See—*
Yoneoka, Mikio; Osugi, Minoru; and Ikarashi, Takeo, 4,232,171, Cl. 560-239.000.
Ikeda, Mankichi, to Kabushiki Kaisha Ikeda Seisakusho; and Sugita Sangyo Kabushiki Kaisha. Capstan. 4,231,551, Cl. 254-344.000.
Ikemi, Tadashi: *See—*
Kato, Tadanari; Ikemi, Tadashi; and Sagawa, Takatoshi, 4,231,900, Cl. 252-466.0PT.
Ikumoto, Takeshi: *See—*
Touyama, Ryousuke; Inouye, Hiroyuki; Shingu, Tetsuro; Takeda, Yoshio; Ikumoto, Takeshi; Okuyama, Hidetoshi; and Yamamoto, Osamu, 4,232,159, Cl. 546-112.000.
Illinois Tool Works Inc.: *See—*
Reinwall, Ernest W., Jr., 4,231,281, Cl. 85-50.0AT.
Imai, Ryoji: *See—*
Nakano, Kinichi; Urakawa, Chikahiro; and Imai, Ryoji, 4,231,936, Cl. 260-326.240.
Imperial Chemical Industries Limited: *See—*
Barr, Dennis A.; and Rose, John B., 4,232,142, Cl. 528-125.000.
Bentley, John; and Thompson, Morice W., 4,232,135, Cl. 525-509.000.
Boyle, Francis T.; and Davies, Alan, 4,232,032, Cl. 424-269.000.
Dalton, Raymond F., 4,231,888, Cl. 252-182.000.
Hutchinson, John; and Whittaker, Graham, 4,231,849, Cl. 204-59.00F.
Imperial Screen Company, Inc.: *See—*
Wilson, Clarence P., 4,232,310, Cl. 340-550.000.
Inagaki, Hiroya: *See—*
Yamamoto, Hideaki; Tsukada, Toshihisa; Maruyama, Eiichi; and Inagaki, Hiroya, 4,232,219, Cl. 250-227.000.
Inagaki, Nobuo: *See—*
Terada, Akira; Hattori, Seizi; Ishii, Yoshikazu; Nohara, Akira; Inagaki, Nobuo; Matsuda, Wakatake; and Kawakami, Susumu, 4,232,071, Cl. 428-64.000.
Ingemarsson, Gosta, to Eur-Control Kalle AB. Pulp screen device. 4,231,881, Cl. 210-396.000.
Inland Steel Company: *See—*
Elmer, Charles W., 4,231,261, Cl. 73-716.000.
Inoue, Nobuyoshi: *See—*
Saito, Toshihisa; and Inoue, Nobuyoshi, 4,231,650, Cl. 354-246.000.
Inoue, Shigeru: *See—*
Konoki, Keizo; Nobue, Michio; Fukui, Akito; and Inoue, Shigeru, 4,231,961, Cl. 564-65.000.
Inoue, Yasuo: *See—*
Iwasaki, Masayuki; Sato, Shigeru; Inoue, Yasuo; and Nagashima, Akira, 4,232,106, Cl. 430-170.000.
Inouye, George T.; Sanders, Nathaniel L.; and Moss, Winston C., to TRW Inc. Non-arcing dielectric modular array. 4,232,070, Cl. 428-49.000.
Inouye, Hiroyuki: *See—*
Touyama, Ryousuke; Inouye, Hiroyuki; Shingu, Tetsuro; Takeda, Yoshio; Ikumoto, Takeshi; Okuyama, Hidetoshi; and Yamamoto, Osamu, 4,232,159, Cl. 546-112.000.
Integrated Technology Limited: *See—*
Carternock, Frederick A., 4,231,678, Cl. 404-103.000.
Intel Corporation: *See—*
Somekh, Sasson; and Ahlquist, C. Norman, 4,231,811, Cl. 148-1.500.
Inter-Ikea A/S: *See—*
Mikkelsen, Henrik; and Andersen, Bjarne B., 4,231,203, Cl. 52-284.000.
International Business Machines Corporation: *See—*
Chang, Ifay F.; and Shafer, Merrill W., 4,231,892, Cl. 252-301.60F.
Cuomo, Jerome J.; Gangulee, Amitava; and Kobliska, John, 4,231,816, Cl. 148-31.550.
Gazdik, Charles E.; and McBride, Donald G., 4,231,154, Cl. 29-840.000.
Higuchi, Hobart A.; and Yee, Sammy K., 4,232,363, Cl. 363-75.000.
Mortelmans, Joost, 4,232,253, Cl. 315-370.000.
Ray, Asit K.; and Reisman, Arnold, 4,232,057, Cl. 427-39.000.
Tsao, Sherman H., 4,232,324, Cl. 346-75.000.
International Design Systems, Ltd.: *See—*
Roming, Derek, 4,231,677, Cl. 404-89.000.
International Detection Protection: *See—*
Bernier, Raymond, 4,232,291, Cl. 340-147.0MD.
International Educational Services AG: *See—*
Schwab, Klaus M.; and Kahrbek, Detlev, 4,231,655, Cl. 355-40.000.
International Flavors & Fragrances Inc.: *See—*
Sprecker, Mark A.; Schmitt, Frederick L.; Vock, Manfred H.; Vinals, Joaquin F.; and Kiwala, Jacob, 4,231,940, Cl. 260-345.100.
International Harvester Company: *See—*
Jennings, Marvin D., 4,231,432, Cl. 172-7.000.
Windecker, Leo J., 4,232,069, Cl. 428-47.000.
International Telephone and Telegraph Corporation: *See—*
Cooper, William J., 4,231,824, Cl. 156-73.100.
Maklad, Mokhtar S., 4,231,774, Cl. 65-3.00A.
Inventa AG fur Forschung und Patentverwertung, Zurich: *See—*
Schmid, Eduard; and Griehl, Wolfgang, 4,232,145, Cl. 528-324.000.
Ionics, Incorporated: *See—*
Hodgdon, Russell B.; and Alexander, Samuel S., 4,231,855, Cl. 204-301.000.
Ipierre Sirotex, S.p.A: *See—*
Hermine, Mair, 4,231,521, Cl. 239-230.000.
IRECO Chemicals: *See—*
Sudweeks, Walter B.; and Lawrence, Larry D., 4,231,821, Cl. 149-21.000.
Irvin, Howard B.; Lewis, Ronnie L.; and Moczygemba, George A., to Phillips Petroleum Company. Cooling an alpha-methylstyrene polymerization mass. 4,232,137, Cl. 526-71.000.
Irwin, Robert S., to Du Pont de Nemours, E. I., and Company. Polyester which exhibits anisotropy in the melt containing p-oxybenzoyl units and 4,4'-dioxybenzophenone units or methyl and chloro derivatives thereof. 4,232,143, Cl. 528-128.000.
Irwin, Robert S., to Du Pont de Nemours, E. I., and Company. Polyester which exhibits anisotropy in the melt containing p-oxybenzoyl units and 4-oxy-3'-carbonylbenzophenone units or methyl and chloro derivatives of said units. 4,232,144, Cl. 528-128.000.
Irwin, Robert W.: *See—*
Saunders, Michael A.; and Irwin, Robert W., 4,232,356, Cl. 361-415.000.
Isaacson, Henry V., to Eastman Kodak Company. Suspension polymerization of styrene monomers in the presence of carbon black. 4,231,919, Cl. 260-42.530.
Isailovic, Jordan, to MCA Disco-Vision, Inc. Method and means for encoding and decoding digital data. 4,232,388, Cl. 375-110.000.
Isbell, Tim D.: *See—*
Dobkin, Robert C.; Isbell, Tim D.; Miller, Bernard D.; and Sample, Lawrence R., 4,232,271, Cl. 330-258.000.
Ishiba, Jintaro, to Yoshida Kogyo K. K. Indirect extrusion apparatus. 4,231,245, Cl. 72-253.00A.
Ishiba, Teruyuki: *See—*
Hirai, Kentaro; Fujishita, Toshio; and Ishiba, Teruyuki, 4,231,930, Cl. 260-245.500.
Ishida, Hiroaki: *See—*
Kitai, Kiyoshi; Nakagawa, Tadashi; and Ishida, Hiroaki, 4,231,648, Cl. 354-195.000.
Ishida, Kozo: *See—*
Ohnishi, Toshikazu; Ishida, Kozo; and Saitoh, Osamu, 4,232,223, Cl. 250-343.000.
Ishida, Yasuhiko, to Toyota Jidosha Kogyo Kabushiki Kaisha. Apparatus for atomizing fuel in an internal combustion engine. 4,231,329, Cl. 123-52.0MB.
Ishidoshiro, Hiroshi: *See—*
Sando, Yoshikazu; and Ishidoshiro, Hiroshi, 4,231,238, Cl. 68-62.000.
Ishihara Sangyo Kaisha Ltd.: *See—*
Nishiyama, Ryuzo; Takahashi, Ryohei; Fujikawa, Kanichi; Nasu, Rikuo; and Sakashita, Nobuyuki, 4,231,787, Cl. 71-107.000.

Ishii, Yoshikazu: *See*—
Terada, Akira; Hattori, Seizi; Ishii, Yoshikazu; Nohara, Akira; Inagaki, Nobuo; Matsuda, Wakatake; and Kawakami, Susumu, 4,232,071, Cl. 428-64.000.
Ishikawa, Michio: *See*—
Tokudome, Katumi; Ishikawa, Michio; and Hattori, Shuzo, 4,232,274, Cl. 331-94.50S.
Ishimitsu, Kichio K.; and Tinoco, Edward N., to Boeing Company, The. Airfoil for controlling refueling boom. 4,231,536, Cl. 244-135.00A.
Istvanffy, Stephen M.; and Linse, Vonne D., to Canadian Industries Limited. Method of welding metal pipe sections with explosives. 4,231,506, Cl. 228-109.000.
Ito, Tomo: *See*—
Nishimiya, Torazo; Okumura, Masamitsu; Ito, Tomo; and Numakura, Seisaku, 4,231,340, Cl. 123-568.000.
ITT Industries, Inc.: *See*—
Gerlach, Albrecht; Holzmann, Dieter; Lindstedt, Guenter; and Burth, Rolf-Dieter, 4,232,297, Cl. 340-168.00S.
ITW Fastex Italia S.p.A.: *See*—
Aimar, Michele, 4,231,485, Cl. 220-210.000.
Iudica, Robert T., to Professional Mfg. Corp. Unitary cartridge type turbine assembly. 4,231,739, Cl. 433-126.000.
Ivanov, Jury P. Dry dock for building vessels. 4,231,679, Cl. 405-4.000.
Ivanov, Vasily T.: *See*—
Unigovsky, Mikhail R.; Rulevsky, Evgeny V.; Sapa, Fedor I.; Parkhomchuk, Alexei T.; Yampolsky, Arnold S.; Rotenfeld, Veniamin S.; Ivanov, Vasily T.; Nemirovsky, Isaak Y.; Kovalenko, Viktor M.; and Vnuchenko, Nikolai S., 4,231,694, Cl. 409-179.000.
Iwamatsu, Seiichi, to VLSI Technology Research Association. Light-reflection type pattern forming system. 4,231,657, Cl. 355-71.000.
Iwasaki, Masayuki; Sato, Shigeru; Inoue, Yasuo; and Nagashima, Akira, to Fuji Photo Film Co., Ltd. Photosensitive compositions containing 2-halomethyl-5-vinyl-1,3,4-oxadiazoles as free radical progenitors. 4,232,106, Cl. 430-170.000.
Iwata, Akiyoshi, to Quanta-Ray, Inc. Laser apparatus. 4,232,276, Cl. 331-94.50D.
Iwatsu Electric Co., Ltd.: *See*—
Kokaji, Norio; Kinoshita, Kunio; Urano, Toshihiro; and Saito, Katsunori, 4,232,323, Cl. 346-74.100.
J. M. Voith GmbH: *See*—
Merkle, Theodor; Hausenblas, Bernhard; Schweickert, Hermann; and Wengert, Dieter, 4,231,594, Cl. 285-3.000.
Ortner, Herbert; Bahr, Theodor; and Musselmann, Walter, 4,231,526, Cl. 241-28.000.
J. Nesbit-Evans & Co. Ltd.: *See*—
Croxton, John M., 4,231,124, Cl. 5-63.000.
Jackson, Keith L., to General Steel Industries, Inc. Three-truck high adhesion locomotive. 4,231,296, Cl. 105-136.000.
Jackson, Leland B.; and Jaron, Dov, to Regents for Education of the State of Rhode Island. Compensation of fluidic transducers. 4,232,373, Cl. 364-572.000.
Jagatich, Carl T., to Ohio Nuclear, Inc. Video speed logarithmic analog-to digital converter. 4,232,302, Cl. 340-347.0AD.
James, David L., to James, Mitchell D. Protective liner for tires resistant to displacement during use. 4,231,407, Cl. 152-351.000.
James, Donald E. Cooking utensil with integrally formed pot attaching means. 4,231,128, Cl. 7-112.000.
James, Mitchell D.: *See*—
James, David L., 4,231,407, Cl. 152-351.000.
Jamieson, Peter B., to Minnesota Mining and Manufacturing Company. Light-handleable photographic materials. 4,232,116, Cl. 430-510.000.
Janome Sewing Machine Co., Ltd.: *See*—
Takenoya, Hideaki, 4,231,307, Cl. 112-158.00E.
Janssen Pharmaceutica, N.V.: *See*—
Heeres, Jan; Backx, Leo J. J.; and Mostmans, Joseph H., 4,232,034, Cl. 424-269.000.
Janssens, Wilhelmus, to AGFA-GEVAERT N.V. Photographic material suited for use in diffusion transfer photography and method of diffusion transfer photography using such material. 4,232,107, Cl. 430-223.000.
Jansson, Hans B. E., to AB Volvo. Method for the production of tools for deep drawing, moulding, extruding and the like. 4,231,982, Cl. 264-112.000.
Jantsch, Ottomar; and Tihanyi, Jeno, to Siemens Aktiengesellschaft. Process for producing bi-polar charge coupled devices by ion-implantation. 4,231,810, Cl. 148-1.500.
Japan Medical Supply Co., Ltd.: *See*—
Kurata, Motoji, 4,231,988, Cl. 422-47.000.
Jaron, Dov: *See*—
Jackson, Leland B.; and Jaron, Dov, 4,232,373, Cl. 364-572.000.
Jaunin, Jean-Pierre, to Societe Suisse pour l'Industrie Horlogere Management Services S.A. Timesetting arrangement for electrical timepieces. 4,232,384, Cl. 368-185.000.
Jenninga, Marvin D., to International Harvester Company. Position and draft control system for plows. 4,231,432, Cl. 172-7.000.
Jensen, Elwood V.; and DeSombre, Eugene R., to University Patents, Inc. Methods and materials for detection of estrophilin. 4,232,001, Cl. 424-1.000.
Jensen, Svend O. Demountable boat ladder. 4,231,448, Cl. 182-93.000.
Jimenez, Humberto A.: *See*—
Perez, Jose L.; and Jimenez, Humberto A., 4,231,625, Cl. 312-245.000.
Jirkovsky, Ivo L.: *See*—
Philipp, Adolf H.; and Jirkovsky, Ivo L., 4,232,029, Cl. 424-263.000.
JMR Instruments, Inc.: *See*—
Loiler, Roger D., 4,232,389, Cl. 455-12.000.
Johne, Bruce. Electrically powered paint scraping tool. 4,231,155, Cl. 30-169.000.
Johns-Manville Corporation: *See*—
French, David W., 4,231,983, Cl. 264-249.000.
Johnson, Allan B., to Mark Controls Corporation. Thermostat. 4,231,512, Cl. 236-47.000.
Johnson, Allen S., Jr. Bag-type filter apparatus with internal air diffuser. 4,231,770, Cl. 55-302.000.
Johnson, Delbert C.: *See*—
Adams, Halbert E.; Cooper, Edgar R.; Ford, Lowell D.; Johnson, Delbert C.; and Warren, Gregory L., 4,232,378, Cl. 367-36.000.
Johnson, Howard K.: *See*—
Engelbrecht, Horst P.; and Johnson, Howard K., 4,231,974, Cl. 261-87.000.
Johnson & Johnson: *See*—
Lindemann, Martin K. O.; and Verdicchio, Robert J., 4,231,903, Cl. 252-545.000.
Johnson, Michael R., to Pfizer Inc. Hexahydro-1-hydroxy-9-hydroxymethyl-3-substituted-6H-dibenzo[b,d]pyrans as analgesic agents. 4,232,018, Cl. 424-248.550.
Johnson, Roger F.; and Mitzel, Allen M., to Boeing Company, The. Apparatus and method for measuring static deflection of runway surface under aircraft loading. 4,231,160, Cl. 33-174.00P.
Johnson, Rubein V. Acoustic lens speaker cabinet. 4,231,445, Cl. 181-148.000.
Johnson, Walter: *See*—
Campbell, Ivor E.; Henderson, James M.; Johnson, Walter; and Wetherill, William H., 4,231,995, Cl. 423-242.000.
Johnston, William J., to General Motors Corporation. Diesel fuel heat recovery system and control valve therefor. 4,231,342, Cl. 123-557.000.
Jonasson, Kjell O.; and Andersson, Sven A., to AB Volvo. Child's seat cushion for motor vehicles. 4,231,613, Cl. 297-250.000.
Jones, George F., to Wheelabrator-Frye Inc. Method of treating parts by vibratory action. 4,231,196, Cl. 51-313.000.
Jonsson, Karl-Erik A. Device for treatment of the surface of round timber. 4,231,406, Cl. 144-208.00E.
Joseph, Joseph P.: *See*—
Nair, Vijay G.; Joseph, Joseph P.; and Bernstein, Seymour, 4,232,150, Cl. 536-119.000.
Jottier, Christian F., to S.A. Anarec. Apparatus for the treatment of fluids. 4,231,990, Cl. 422-100.000.
Juenemann, Werner: *See*—
Dehnert, Johannes; and Juenemann, Werner, 4,231,746, Cl. 8-680.000.
Justus, Edgar J. Hydraulic impact device. 4,231,434, Cl. 173-119.000.
Juziuk, Jurgen A.; Mack, Ronald H.; Banka, Eugene F.; and Nicol, Edward A., to Burroughs Corporation. Stepper motor drive for a mechanical camshaft. 4,232,217, Cl. 235-480.000.
K-Line Industries, Inc.: *See*—
Kammeraad, James A., 4,231,693, Cl. 408-230.000.
Kablaoui, Mahmoud S., to Texaco Inc. Motor fuel composition. 4,231,758, Cl. 44-71.000.
Kabushiki Kaisha Ikeda Seisakusho: *See*—
Ikeda, Mankichi, 4,231,551, Cl. 254-344.000.
Kabushiki Kaisha Kogen: *See*—
Mizuno, Shuzo, 4,232,306, Cl. 340-506.000.
Kabushiki Kaisha Seikosha: *See*—
Hamatani, Mitsuhiro, 4,232,241, Cl. 310-317.000.
Kabushiki Kaisha Suwa Seikosha: *See*—
Banda, Syunji, 4,231,639, Cl. 350-335.000.
Chihara, Hiroyuki, 4,232,383, Cl. 368-66.000.
Kahrbek, Detlev: *See*—
Schwab, Klaus M.; and Kahrbek, Detlev, 4,231,655, Cl. 355-40.000.
Kaieda, Nobuo; and Okano, Yoshihiro, to Yokogawa Electric Works, Ltd. Servo-system. 4,232,259, Cl. 318-615.000.
Kajihara, Motoyoshi; Hamakawa, Toshihiro; Shibata, Toshiaki; Suzue, Takashi; and Fujii, Setsuro, to Taiho Pharmaceutical Company Ltd. Oral antilipemic agents. 4,232,007, Cl. 424-177.000.
Kalberer, Heinz: *See*—
Michel, Wolfgang; and Kalberer, Heinz, 4,232,128, Cl. 521-134.000.
Kalfoglou, George, to Texaco Inc. Surfactant waterflooding oil recovery method. 4,231,427, Cl. 166-275.000.
Kamachi, Hajime: *See*—
Naito, Takayuki; Okumura, Jun; and Kamachi, Hajime, 4,231,928, Cl. 260-239.100.
Kamada, Isao, to Mitsubishi Rayon Company, Limited. Multi-colored synthetic resin sheet. 4,232,078, Cl. 428-195.000.
Kamezawa, Yasutoki: *See*—
Fukuda, Hideo; Morikawa, Hiroichi; Kamezawa, Yasutoki; and Aizawa, Tatsuo, 4,232,101, Cl. 430-56.000.
Kamino, Yukishige: *See*—
Sakamoto, Masakatsu; Uchida, Kenji; and Kamino, Yukishige, 4,231,686, Cl. 406-14.000.
Kammeraad, James A., to K-Line Industries, Inc. Reamer with radial relief. 4,231,693, Cl. 408-230.000.
Kamoto, Hidetoshi, to Sony Corporation. Apparatus for indicating the amount of tape wound upon a reel. 4,232,371, Cl. 364-561.000.
Kanatani, Heiichi; Osumi, Masato; and Hayama, Hajime, to Sanyo Electric Co., Ltd. Solar heat collecting apparatus. 4,231,353, Cl. 126-443.000.

Kandachi, Takayoshi: *See*—
Okino, Seiki; Nakata, Kunio; Yanai, Tosiharu; and Kandachi, Takayoshi, 4,232,062, Cl. 427-160.000.

Kanebo, Ltd.: *See*—
Tsukamoto, Goro; Yoshino, Koichiro; Morita, Tominori; Nose, Takashi; and Okazaki, Mitsuo, 4,232,010, Cl. 424-200.000.

Kaneko, Tamaki; Miyakawa, Seiichi; Satomi, Toyokazu; Koizumi, Yutaka; Nakamura, Isao; and Tabata, Yasuhiro, to Ricoh Company, Ltd. Auto document feeder for use with duplex copying machine. 4,231,561, Cl. 271-3.100.

Kano, Seiji: *See*—
Kubota, Shigeru; Kano, Seiji; and Kubo, Masahiro, 4,231,152, Cl. 29-621.000.

Kansas State University Research Foundation: *See*—
Deyoe, Charles W.; and Bartley, Erle E., 4,232,046, Cl. 426-69.000.

Kao, Jar-lin; and Sheng, Ming N., to Atlantic Richfield Company. Preparation of alkylene carbonates from alkylene iodohydrins. 4,231,937, Cl. 260-340.200.

Kao Soap Co., Ltd.: *See*—
Yagi, Kouichi; and Nakagawa, Yunosuke, 4,231,890, Cl. 252-186.000.

Kariyama, Kenji: *See*—
Kubota, Kenichi; Mukai, Osamu; and Kariyama, Kenji, 4,231,716, Cl. 417-315.000.

Karl M. Reich Maschinenfabrik GmbH, Firma: *See*—
Nicklas, Walter; Hesler, Dietrich; and Gresser, Gerhard, 4,232,064, Cl. 427-208.400.

Kashiwa, Norio: *See*—
Minami, Syuji; and Kashiwa, Norio, 4,232,139, Cl. 526-125.000.

Kato, Hironobu, to Nissan Motor Company, Limited. Process for a cationic cathodic electrocoat. 4,231,850, Cl. 204-181.00C.

Kato, Masaru: *See*—
Shinohara, Hideaki; Kato, Masaru; and Takamatsu, Yoshiaki, 4,232,105, Cl. 430-160.000.

Kato, Osamu; Uemura, Seiichi; Yamamoto, Syunichi; Hirose, Takao; and Takashima, Hiroaki, to Nippon Oil Co., Ltd. Process for preparing petroleum-derived binder pitch. 4,231,857, Cl. 208-40.000.

Kato, Tadanari; Ikemi, Tadashi; and Sagawa, Takatoshi, to Nissan Motor Company, Limited. Method for forming activated alumina coating on refractory article and article thereby produced. 4,231,900, Cl. 252-466.0PT.

Kaufhold, Manfred; Hepp, Dieter; and Menzel, Gerhard, to Chemische Werke Huls Aktiengesellschaft. Use of di-(cyclohexylethylmethylol) phthalates or di-(ethylcyclohexylmethylol) phthalates as plasticizers for polyvinyl chloride. 4,231,915, Cl. 260-31.80R.

Kaufman, Robert J.: *See*—
Franz, John E.; and Kaufman, Robert J., 4,231,782, Cl. 71-87.000.

Kaufman, Vernon R., to Tecumseh Products Company. Steel connecting rod bearing liner for internal combustion engines. 4,231,623, Cl. 308-23.000.

Kawa, Hidetoshi: *See*—
Nakagawa, Hiroshi; Kawa, Hidetoshi; and Kawai, Makoto, 4,232,335, Cl. 358-101.000.

Kawaguchi, Fumikazu: *See*—
Fujita, Isao; Onoda, Mamoru; Kawaguchi, Fumikazu; Takenake, Yoshimichi; and Tsutaya, Tadao, 4,231,797, Cl. 75-256.000.

Kawai, Makoto: *See*—
Nakagawa, Hiroshi; Kawa, Hidetoshi; and Kawai, Makoto, 4,232,335, Cl. 358-101.000.

Kawai, Masanobu: *See*—
Okii, Mitsuyoshi; Onitake, Tatsuya; Kawai, Masanobu; Takematsu, Tetsuo; and Konnai, Makato, 4,231,789, Cl. 71-121.000.

Kawai Musical Instrument Mfg. Co. Ltd.: *See*—
Deutsch, Ralph, 4,231,278, Cl. 84-1.190.

Kawai, Syuji: *See*—
Yamauchi, Kazuhisa; Tanaka, Taku; Kawai, Syuji; and Tanii, Hirokuni, 4,231,877, Cl. 210-321.00B.

Kawakami, Susumu: *See*—
Terada, Akira; Hattori, Seizi; Ishii, Yoshikazu; Nohara, Akira; Inagaki, Nobuo; Matsuda, Wakatake; and Kawakami, Susumu, 4,232,071, Cl. 428-64.000.

Kawamata, Motoo: *See*—
Oba, Masayuki; Kawamata, Motoo; Tsuboi, Hikotada; and Koga, Nobuhito, 4,231,934, Cl. 260-326.5FM.

Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Tachibana, Hisataro; and Ono, Hiromi, 4,231,315, Cl. 440-43.000.

Kawasumi, Yoshio; and Sato, Haruki, to Nippon Mining Co., Ltd. Method for making a raw board for use in printed circuits. 4,231,848, Cl. 204-20.000.

Kawaziri, Kazuhiro: *See*—
Tabei, Masatoshi; Kawaziri, Kazuhiro; and Nakajima, Yosuke, 4,231,808, Cl. 136-260.000.

Keeling, Michael C.; and Doss, Dwight E., to Motorola, Inc. Enclosure for a solar cell array. 4,231,807, Cl. 136-251.000.

Kefalas A/S: *See*—
Poschel, Bruno P. H.; and Maxwell, Donald R., 4,232,021, Cl. 424-250.000.

Keil, Wolfgang. Device for complete desalination of water. 4,231,872, Cl. 210-93.000.

Keim, John E.: *See*—
Lee, Maw H.; and Keim, John E., 4,232,308, Cl. 340-539.000.

Kelley Manufacturing Co.: *See*—
Whitfield, Carroll J.; and Lastinger, Anthony W., 4,231,433, Cl. 172-662.000.

Kelley, Wilfred H., Jr.: *See*—
Hedtke, Robert G.; Harrom, Harley A.; Kelley, Wilfred H., Jr.; and Frederick, Sherman B., 4,231,450, Cl. 187-9.00R.

Kelly, Peter B., to General Electric Company. Bowling lane and surface. 4,231,573, Cl. 273-51.000.

Kelly, Walter J., to Goodyear Tire & Rubber Company, The. Preparation of unsymmetrical polyenes. 4,232,180, Cl. 585-645.000.

Kelsall, Jeffrey C., to McGraw-Edison Company. Adjustable light fixture. 4,232,361, Cl. 362-364.000.

Kelso, David W.: *See*—
Gantz, Jeanne A.; and Kelso, David W., 4,231,634, Cl. 350-4.200.

Kemmner, Ulrich: *See*—
Ruhl, Karl; and Kemmner, Ulrich, 4,231,718, Cl. 417-366.000.

Kempter, Fritz E.: *See*—
Boehlke, Klaus; and Kempter, Fritz E., 4,231,854, Cl. 204-294.000.

Kennedy, Matthew R.: *See*—
Weiss, Thomas R.; and Kennedy, Matthew R., 4,231,446, Cl. 181-148.000.

Kenton, Hobart E.; and Decker, Forrest W., to PPG Industries, Inc. Plate counter. 4,232,218, Cl. 250-222.0PC.

Kern, Horstmar; and Botzenhardt, Helmut, to Wieland-Werke Aktiengesellschaft. Heat-insulated structural section assembly. 4,231,207, Cl. 52-730.000.

Kern, James W.: *See*—
Grant, Andrew C.; and Kern, James W., 4,232,056, Cl. 427-37.000.

Kern, Neil C., to Motorola, Inc. Range detector. 4,232,315, Cl. 343-7.300.

Kerotest Manufacturing Corp.: *See*—
Visalli, Robert G., 4,231,549, Cl. 251-335.00A.

Kersting, Hans-Joachim: *See*—
Weber, Heinrich; Lorenz, Kurt; Dungs, Horst; Kurtz, Roman; and Kersting, Hans-Joachim, 4,231,844, Cl. 201-34.000.

Kessler, Theodore P., to Timron, Inc. Shipping carton for pile fabric and a machine for winding pile fabric on a reel. 4,231,475, Cl. 206-389.000.

Ketzer, Manfred, to U.S. Philips Corporation. Adjusting mechanism for a tape recorder capstan. 4,231,504, Cl. 226-180.000.

Kharkhardin, Petr P.: *See*—
Kuznetsov, Vyacheslav D.; Preobrazhensky, Boris P.; Rozhnov, Valentin E.; Stepanov, Jury V.; Belitsky, Anatoly N.; Beizer, Viktor N.; Tokar, Grigory A.; Plastovets, Ivan K.; Barylo, Ivan I.; Koval, Boris A.; Chepurnykh, Sergei F.; Chumachenko, Petr N.; Simonov, Nikolai F.; Kharkhardin, Petr P.; and Litmanovich, Ilya M., 4,231,860, Cl. 209-169.000.

Kiejzik, Paul A. Device for inserting a microfilm into microfilm jackets in series. 4,231,214, Cl. 53-520.000.

Kikuchi, Toshikazu, to Hope Co., Ltd. Ski boot heel binding equipped with ski brake. 4,231,584, Cl. 280-604.000.

Kilevitsa, Marite K.: *See*—
Paegle, Ruta A.; Lidaka, Marger J.; Zhuk, Regina A.; Maurinsh, Juris A.; Zidermane, Aina A.; and Kilevitsa, Marite K., 4,232,149, Cl. 536-23.000.

Kimmon Electric Co., Ltd.: *See*—
Tokudome, Katumi; Ishikawa, Michio; and Hattori, Shuzo, 4,232,274, Cl. 331-94.50S.

Kimura, Makoto; and Iizuka, Yutaka, to Nippon Kogaku K.K. Viewfinder display in a single lens reflex camera. 4,231,649, Cl. 354-224.000.

Kinch, Michael A.: *See*—
Chapman, Richard A.; Buss, Dennis D.; and Kinch, Michael A., 4,231,149, Cl. 29-578.000.

King, Samuel B. Gasoline and petroleum fuel supplement. 4,231,756, Cl. 44-53.000.

Kinney, Frank N. Refuse collection device. 4,231,602, Cl. 294-1.0BA.

Kinoshita, Kunio: *See*—
Kokaji, Norio; Kinoshita, Kunio; Urano, Toshihiro; and Saito, Katsunori, 4,232,323, Cl. 346-74.100.

Kinsey, J. D.: *See*—
Erwin, Robert L., 4,231,440, Cl. 137-246.220.

Kiovsky, Joseph R.; and Goyette, William J., to Norton Company. Hydroisomerization of pentane utilizing Pd exchanged mordenite. 4,232,181, Cl. 585-739.000.

Kirby, Robert E., to Telex Computer Products, Inc. Apparatus for connection of coaxial cables to a printed circuit mother board. 4,231,629, Cl. 339-17.00M.

Kishino, Takao; and Tanaka, Gentaro, to Futaba Denshi Kogyo K.K. Multi-digit luminescent display tube. 4,232,251, Cl. 315-167.000.

Kitai, Kiyoshi; and Takazawa, Yuzuru, to Seiko Koki Kabushiki Kaisha. Automatic focusing camera. 4,231,647, Cl. 354-195.000.

Kitai, Kiyoshi; Nakagawa, Tadashi; and Ishida, Hiroaki, to Seiko Koki Kabushiki Kaisha. Automatic focusing camera. 4,231,648, Cl. 354-195.000.

Kitamura, Hajime: *See*—
Koyanagi, Shunichi; Kitamura, Hajime; and Kurimoto, Kazuhiko, 4,232,141, Cl. 526-344.200.

Kitaori, Kiyoshi: *See*—
Fujita, Masao; and Kitaori, Kiyoshi, 4,231,240, Cl. 70-173.000.

Kitayama, Seishi: *See*—
Yamamoto, Seiichi; and Kitayama, Seishi, 4,232,400, Cl. 455-305.000.

Kiwala, Jacob: *See*—
Sprecker, Mark A.; Schmitt, Frederick L.; Vock, Manfred H.; Vinals, Joaquin F.; and Kiwala, Jacob, 4,231,940, Cl. 260-345.100.

Kizaki, Shigeru, to Citizen Watch Co., Ltd. Method for manufacturing subminiature quartz crystal vibrator. 4,232,109, Cl. 430-312.000.

Klas, Kenneth H., to Allis-Chalmers Corporation. Single belt drive for a three-spindle rotary mower. 4,231,215, Cl. 56-11.600.
Kleinschmitt, David: *See*—
Feinland, Seymour; and Kleinschmitt, David, 4,231,662, Cl. 356-373.000.
Kloeber, Peter: *See*—
Becker, Friedbert; Biethan, Gunter; and Kloeber, Peter, 4,232,318, Cl. 370-29.000.
Kluge, Arthur F.; and Muchowski, Joseph M., to Syntex (U.S.A.) Inc. 5-Alkylsulfinylbenzoyl- and 5-alkylsulfonylbenzoyl-1,2-dihydro-3H-pyrrolo[1,2-a]pyrrole-1-carboxylic acids. 4,232,038, Cl. 424-274.000.
Knappenberger, Thomas A.; and Landers, James F., Jr., to Motorola, Inc. Potting and encapsulating material for electronic circuits. 4,231,916, Cl. 260-37.0EP.
Knofel, Hartmut; and Konig, Klaus, to Bayer Aktiengesellschaft. Process for the production of monoisocyanate. 4,231,952, Cl. 260-453.00P.
Knoski, Jerry L. Easy change wheel assembly. 4,231,670, Cl. 403-11.000.
Knotek, Otto: *See*—
Kruske, Gerhard; Knotek, Otto; and Lugscheider, Erich, 4,231,793, Cl. 75-122.000.
Knutsen, Karl I. Waste dispensing device for recreational vehicles and the like. 4,231,595, Cl. 285-38.000.
Kobayashi, Minoru, to Olympus Optical Co., Ltd. Mode switching mechanism for a cassette tape recorder. 4,232,349, Cl. 360-105.000.
Kobe Steel, Limited: *See*—
Fujita, Isao; Onoda, Mamoru; Kawaguchi, Fumikazu; Takenake, Yoshimichi; and Tsutaya, Tadao, 4,231,797, Cl. 75-256.000.
Kobler, Edith: *See*—
Kobler, Richard, 4,232,346, Cl. 360-71.000.
Kobler, Richard, to Kobler, Edith; and Frey, Ernst. Apparatus for repeated reproduction of intelligence on selected portions of magnetic tape. 4,232,346, Cl. 360-71.000.
Kobliska, John: *See*—
Cuomo, Jerome J.; Gangulee, Amitava; and Kobliska, John, 4,231,816, Cl. 148-31.550.
Koch, Helmut: *See*—
Boatwright, John T.; Prince, David G.; Haskett, William F.; and Koch, Helmut, 4,232,199, Cl. 179-18.00B.
Koches, Andrew: *See*—
Ebreo, Mark A.; and Koches, Andrew, 4,231,140, Cl. 24-237.000.
Kockum Industries, Inc.: *See*—
Neilson, Jay C., 4,231,464, Cl. 198-456.000.
Koeneman, James B., to Lord Corporation. Knee joint prosthesis. 4,231,122, Cl. 3-1.911.
Koenig & Bauer Aktiengesellschaft: *See*—
Weschenfelder, Otto T.; and Michalik, Horst B., 4,231,559, Cl. 493-426.000.
Koenig, Nathan H.; and Friedman, Mendel, to United States of America, Agriculture. Shrinkproofing wool with copper salts of carboxylic acids. 4,231,747, Cl. 8-127.600.
Koga, Hideaki: *See*—
Nishikawa, Kazuyoshi; Uno, Makoto; and Koga, Hideaki, 4,231,266, Cl. 74-467.000.
Koga, Nobuhito: *See*—
Oba, Masayuki; Kawamata, Motoo; Tsuboi, Hikotada; and Koga, Nobuhito, 4,231,934, Cl. 260-326.5FM.
Kogo, Yasuo: *See*—
Toyama, Takashi; and Kogo, Yasuo, 4,231,169, Cl. 36-43.000.
Kohama, Masayuki: *See*—
Satoh, Eiji; Kohama, Masayuki; Yokoya, Kunihiko; Yamada, Kenji; and Nemoto, Akira, 4,231,673, Cl. 403-125.000.
Kohler, Rolf-Dieter: *See*—
Hagen, Helmut; and Kohler, Rolf-Dieter, 4,232,165, Cl. 548-339.000.
Kohori, Yoshinori. Ash tray. 4,231,379, Cl. 131-235.00R.
Koitabashi, Takeo: *See*—
Okauchi, Ken; Koitabashi, Takeo; and Fujimori, Noboru, 4,232,118, Cl. 430-574.000.
Koizumi, Yutaka: *See*—
Kaneko, Tamaki; Miyakawa, Seiichi; Satomi, Toyokazu; Koizumi, Yutaka; Nakamura, Isao; and Tabata, Yasuhiro, 4,231,561, Cl. 271-3.100.
Kokaji, Norio; Kinoshita, Kunio; Urano, Toshihiro; and Saito, Katsunori, to Iwatsu Electric Co., Ltd. Magnetographic apparatus. 4,232,323, Cl. 346-74.100.
Kokot, Hellmut: *See*—
Romey, Ingo; and Kokot, Hellmut, 4,231,856, Cl. 208-39.000.
Kokusai Denshin Denwa Kabushiki Kaisha: *See*—
Yamamoto, Seiichi; and Kitayama, Seishi, 4,232,400, Cl. 455-305.000.
Kokusan Kinzoku Kogyo Kabushiki Kaisha: *See*—
Fujita, Masao; and Kitaori, Kiyoshi, 4,231,240, Cl. 70-173.000.
Kolb, William P., Jr., to Hughes Aircraft Company. Adjustable mirror mount for a laser. 4,232,275, Cl. 331-94.50D.
Kolbeck, Rainer: *See*—
Schaffernicht, Klaus; and Kolbeck, Rainer, 4,231,627, Cl. 316-25.000.
Koller, Stefan, to Ciba-Geigy Corporation. Styryl compounds. 4,231,942, Cl. 260-346.710.
Kolpak, Miroslav M., to Standard Oil Company (Indiana). Lateral tensioning system for riser pipe. 4,231,429, Cl. 166-362.000.
Komori, Shinichi: *See*—
Takeuchi, Yo; Ohbori, Koichi; Hatsushika, Masabumi; and Komori, Shinichi, 4,231,817, Cl. 148-32.500.
Kondo, Isao: *See*—
Tsunefuji, Katsuhiko; and Kondo, Isao, 4,231,644, Cl. 354-51.000.
Kondou, Takayasu: *See*—
Ando, Shigeo; and Kondou, Takayasu, 4,231,276, Cl. 84-1.190.
Konig, Axel, to Volkswagenwerk Aktiengesellschaft. Pump for fluid media having different temperatures. 4,231,720, Cl. 417-379.000.
Konig, Klaus: *See*—
Knofel, Hartmut; and Konig, Klaus, 4,231,952, Cl. 260-453.00P.
Konishiroku Photo Industry Co., Ltd.: *See*—
Kuse, Satoru, 4,232,112, Cl. 430-393.000.
Okauchi, Ken; Koitabashi, Takeo; and Fujimori, Noboru, 4,232,118, Cl. 430-574.000.
Shinozaki, Sohji; and Takei, Yoshiaki, 4,232,104, Cl. 430-68.000.
Koniz, Leon F.; and Estes, John H., to Texaco Inc. Novel method of testing a charge calcined alumina to determine its suitability for use in hydrocarbon conversion. 4,231,751, Cl. 23-230.00R.
Konnai, Makato: *See*—
Okii, Mitsuyoshi; Onitake, Tatsuya; Kawai, Masanobu; Takematsu, Tetsuo; and Konnai, Makato, 4,231,789, Cl. 71-121.000.
Konoki, Keizo; Nobue, Michio; Fukui, Akito; and Inoue, Shigeru, to Toyo Engineering Corporation; and Mitsui Toatsu Chemicals, Incorporated. Process for preparation of urea. 4,231,961, Cl. 564-65.000.
Koppers Company, Inc.: *See*—
Pennino, Charles J., 4,231,908, Cl. 260-28.5AS.
Korenko, Michael K.: *See*—
Gibson, Robert C.; and Korenko, Michael K., 4,231,795, Cl. 75-171.000.
Kosicki, Witold W.: *See*—
Corris, Charles J.; Hollingsworth, Charles M.; Kosicki, Witold W.; and Potter, Robert T., 4,231,184, Cl. 46-265.000.
Koszelak, Thaddeus D.: *See*—
Gilman, Paul B., Jr.; Belly, Robert T.; Koszelak, Thaddeus D.; and Zigman, Seymour, 4,232,121, Cl. 435-32.000.
Kovacsay, Istvan; Szajko nee Lorinczi, Maria; Dubovszky, Istvan; Magdanyi, Laszlo; Szailer, Ferenc; and Szatmari, Ede, to Muanyagipari Kutato Intezet; and Finomvegyszer Szovetkezet, part interest to each. Process for the controlled hardening of unsaturated polyester resins. 4,232,136, Cl. 525-327.000.
Koval, Boris A.: *See*—
Kuznetsov, Vyacheslav D.; Preobrazhensky, Boris P.; Rozhnov, Valentin E.; Stepanov, Jury V.; Belitsky, Anatoly N.; Beizer, Viktor N.; Tokar, Grigory A.; Plastovets, Ivan K.; Barylo, Ivan I.; Koval, Boris A.; Chepurnykh, Sergei F.; Chumachenko, Petr N.; Simonov, Nikolai F.; Kharkhardin, Petr P.; and Litmanovich, Ilya M., 4,231,860, Cl. 209-169.000.
Kovalenko, Viktor M.: *See*—
Unigovsky, Mikhail R.; Rulevsky, Evgeny V.; Sapa, Fedor I.; Parkhomchuk, Alexei T.; Yampolsky, Arnold S.; Rotenfeld, Veniamin S.; Ivanov, Vasily T.; Nemirovsky, Isaak Y.; Kovalenko, Viktor M.; and Vnuchenko, Nikolai S., 4,231,694, Cl. 409-179.000.
Koyanagi, Shunichi; Kitamura, Hajime; and Kurimoto, Kazuhiko, to Shin-Etsu Chemical Co., Ltd. Method for the preparation of vinyl chloride polymers. 4,232,141, Cl. 526-344.200.
Kraft, Joseph K., to Westinghouse Electric Corp. Spring applied, electric released drum brake. 4,231,452, Cl. 188-171.000.
Kraftwerk Union Aktiengesellschaft: *See*—
Gugel, Georg, 4,231,419, Cl. 165-11.00A.
Kramer, Wolfgang; Buchel, Karl H.; Pflugbeil, Wolf-Dietrich; Frohberger, Paul-Ernst; and Brandes, Wilhelm, to Bayer Aktiengesellschaft. Combating fungi with diastereomeric form A of 1-phenoxy-3,3-dimethyl-1-(1,2,4-triazol-1-yl)-butan-2-ols. 4,232,033, Cl. 424-269.000.
Krapcho, John: *See*—
Turk, Chester F.; and Krapcho, John, 4,232,027, Cl. 424-258.000.
Krause, David A. Combination ski lock and safety strap. 4,231,586, Cl. 280-637.000.
Krockenberger, Dieter: *See*—
Magiera, Leonhardt; Grundmann, Raban; and Krockenberger, Dieter, 4,231,968, Cl. 570-109.000.
Kroplinski, Thaddeus F.: *See*—
Brauer, Melvin; and Kroplinski, Thaddeus F., 4,231,986, Cl. 264-272.000.
Kru-Bur, Inc.: *See*—
Burke, James W.; and Cook, John N., 4,231,391, Cl. 137-343.000.
Krude, Werner, to Uni-Cardan Aktiengesellschaft. Rigid non-sliding homokinetic universal joint. 4,231,233, Cl. 64-21.000.
Krueger, Wallace F.; and Shaw, Anthony R., to Libbey-Owens-Ford Company. Solar energy collector. 4,231,204, Cl. 52-397.000.
Krueger, Wallace F.: *See*—
Shaw, Anthony R.; Krueger, Wallace F.; and Bastian, Lloyd E., 4,231,505, Cl. 228-14.000.
Krugener, Rolf; and Kurth, Hermann W., to Daimler-Benz Aktiengesellschaft. Cylinder lock, especially for motor vehicles. 4,231,244, Cl. 70-422.000.
Krumnikl, Svatopluk: *See*—
Rosbiegalle, Rudolf; Farber, Karl; Grimm, Herbert; Schmeisser, Helmut; Schonhut, Hermann; Krumnikl, Svatopluk; and Edel, Gunter, 4,231,669, Cl. 401-258.000.
Kruske, Gerhard; Knotek, Otto; and Lugscheider, Erich, to Metallgesellschaft Aktiengesellschaft. Nickel-base alloy. 4,231,793, Cl. 75-122.000.
Kubo, Masahiro: *See*—
Kubota, Shigeru; Kano, Seiji; and Kubo, Masahiro, 4,231,152, Cl. 29-621.000.

Kubota, Kenichi; Mukai, Osamu; and Kariyama, Kenji, to Tohoku Mikuni Kogyo Co., ltd.; and Mikuni Kogyo Co., Ltd. Mechanical lubricating pump. 4,231,716, Cl. 417-315.000.

Kubota, Shigeru; Kano, Seiji; and Kubo, Masahiro, to Nitto Kogyo K.K. Method and apparatus for press-fitting caps on electronic parts and the like. 4,231,152, Cl. 29-621.000.

Kuetterer, Gerhard: *See*—
Huettner, Robert; Kuetterer, Gerhard; and Sklebitz, Hartmut, 4,232,226, Cl. 250-445.00T.

Kuhl, Bernhard R.; and Safranek, Edward J., to Echlin Manufacturing Company, The. Rotary switch assembly. 4,232,207, Cl. 200-11.00R.

Kuhne, Rudolf; and Hamal, Heinrich, to Hoechst Aktiengesellschaft. Nitroamines, processes for their manufacture and their use as diazo components. 4,231,964, Cl. 564-305.000.

Kuivinen, William L.: *See*—
Gopalakrishnan, Sankaraiyer; and Kuivinen, William L., 4,231,702, Cl. 415-56.000.

Kukacka, Lawrence: *See*—
Zeldin, Arkady; Carciello, Neal; Kukacka, Lawrence; and Fontana, Jack, 4,231,917, Cl. 260-37.0SB.

Kulik, Metro D., to Continental Oil Company. Method for producing ammonia and hydrogen sulfide. 4,231,996, Cl. 423-242.000.

Kumano, Hiroshi: *See*—
Murakami, Kaoru; Okahisa, Mitsugu; Arita, Tomohiko; and Kumano, Hiroshi, 4,231,889, Cl. 252-182.100.

Kumaoka, Michiaki; and Aosima, Sinzi, to Nippon Gakki Seizo Kabushiki Kaisha. Muting arrangement of a radio receiver with a phase-locked loop frequency synthesizer. 4,232,393, Cl. 455-154.000.

Kunimoto, Go: *See*—
Mori, Fumio; Ichinose, Isao; and Kunimoto, Go, 4,232,086, Cl. 428-341.000.

Kuniya, Keiichi: *See*—
Watanabe, Ryuji; Arakawa, Hideo; and Kuniya, Keiichi, 4,231,814, Cl. 148-11.50C.

Kuno, Akira: *See*—
Yoshino, Yasuhisa; Kuno, Akira; and Shinoda, Yoshio, 4,231,257, Cl. 73-432.0CR.

Kuramoto, Akio; and Onishi, Toshinari, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas flow control valve apparatus for use in an internal combustion engine. 4,231,341, Cl. 123-552.000.

Kuraray Co., Ltd.: *See*—
Yamauchi, Kazuhisa; Tanaka, Taku; Kawai, Syuji; and Tanii, Hirokuni, 4,231,877, Cl. 210-321.00B.

Kurata, Motoji, to Japan Medical Supply Co., Ltd. Artificial lung. 4,231,988, Cl. 422-47.000.

Kurath, Paul: *See*—
Tadanier, John S.; Martin, Jerry R.; and Kurath, Paul, 4,231,924, Cl. 260-112.50R.

Kurimoto, Kazuhiko: *See*—
Koyanagi, Shunichi; Kitamura, Hajime; and Kurimoto, Kazuhiko, 4,232,141, Cl. 526-344.200.

Kurita, Toshiaki, to Tomy Kogyo Co., Inc. Toy vehicle having reversing mechanism. 4,231,182, Cl. 46-212.000.

Kuroda, Atsuhiko: *See*—
Ueda, Shinjiro; Takada, Yoshihiro; Mishina, Haruo; and Kuroda, Atsuhiko, 4,231,706, Cl. 416-186.00R.

Kurth, Hermann W.: *See*—
Krugener, Rolf; and Kurth, Hermann W., 4,231,244, Cl. 70-422.000.

Kurtz, Robert J.; and Silverstein, Spencer J., to Howmedica, Incorporated. Pulsatile blood pumping apparatus and method. 4,231,354, Cl. 128-1.00D.

Kurtz, Roman: *See*—
Weber, Heinrich; Lorenz, Kurt; Dungs, Horst; Kurtz, Roman; and Kersting, Hans-Joachim, 4,231,844, Cl. 201-34.000.

Kuse, Satoru, to Konishiroku Photo Industry Co., Ltd. Process for treating silver halide color photographic photosensitive material. 4,232,112, Cl. 430-393.000.

Kutik, Louis F.; and Cecil, Howard E., to Security Plastics Inc. Lever pump with button actuator. 4,231,493, Cl. 222-321.000.

Kutt, Mers; and Osbaldeston, Bernard, to Kutt, Mers. Racket stringing. 4,231,575, Cl. 273-73.00D.

Kuwahara, Akiyasu; and Yanagisawa, Syozo, to Hitachi, Ltd. Air intake system for diesel engine. 4,231,337, Cl. 123-568.000.

Kuznetsov, Vyacheslav D.; Preobrazhensky, Boris P.; Rozhnov, Valentin E.; Stepanov, Jury V.; Belitsky, Anatoly N.; Beizer, Viktor N.; Tokar, Grigory A.; Plastovets, Ivan K.; Barylo, Ivan I.; Koval, Boris A.; Chepurnykh, Sergei F.; Chumachenko, Petr N.; Simonov, Nikolai F.; Kharkhardin, Petr P.; and Litmanovich, Ilya M. Flotation machine. 4,231,860, Cl. 209-169.000.

Kyowa Hakko Kogyo Co., Ltd.: *See*—
Chiba, Hideo; Sasaki, Ryuzo; Yoshikawa, Masaaki; Takahashi, Naofumi; Sugimoto, Etsuro; and Samejima, Hirotoshi, 4,232,044, Cl. 426-44.000.

Kyowa Hakko Kogyo Kabushiki Kaisha: *See*—
Nakano, Kinichi; Urakawa, Chikahiro; and Imai, Ryoji, 4,231,936, Cl. 260-326.240.

Kyritsos, Joseph; and Sacco, Jean, to Rhone-Poulenc-Textile. Fluid shapable sulfuric compositions based on arylaliphatic copolymers. 4,231,913, Cl. 260-30.80R.

Lado, William J., to Pettibone Corporation. System for one-hand control of two winches during hoisting of closed clamshell, with differentiation. 4,231,698, Cl. 414-624.000.

Lagodmos, George P., to Hughes Aircraft Company. Cryogenic regenerator. 4,231,418, Cl. 165-4.000.

Lahr, Robert G., to Ideal Toy Corporation. Differential gear drive. 4,231,183, Cl. 46-262.000.

Laiacona, Michael N. Apparatus for combining phonograph signal with auxiliary audio signal. 4,232,190, Cl. 179-1.00B.

Lake, Ralph J., Jr.: *See*—
Hall, James F., Jr.; Lake, Ralph J., Jr.; and Scholder, William G., 4,231,439, Cl. 177-25.000.

Lam, Inc.: *See*—
Williams, Thomas A.; and Scholze, Alfred O., 4,232,362, Cl. 362-410.000.

Lambkin, Fred M. Universal battery charger/adapter unit. 4,232,260, Cl. 320-2.000.

Lancet, Michael S.; and Curran, George P., to Continental Oil Company. Process for gasification using a synthetic CO_2 acceptor. 4,231,760, Cl. 48-197.00R.

Landers, James F., Jr.: *See*—
Knappenberger, Thomas A.; and Landers, James F., Jr., 4,231,916, Cl. 260-37.0EP.

Landoll Corporation: *See*—
Landoll, Donald R., 4,231,710, Cl. 414-475.000.

Landoll, Donald R., to Landoll Corporation. Tiltable trailer having movable undercarriage. 4,231,710, Cl. 414-475.000.

Lang, Glenn E.; Crotzer, Milburn E.; and Fuoto, John S., to Westinghouse Electric Corp. Automatic steam generator feedwater realignment system. 4,231,328, Cl. 122-504.000.

Lang, William H.: *See*—
Chang, Clarence D.; Lang, William H.; and LaPierre, Rene B., 4,231,955, Cl. 260-465.100.

Langseth, Rollin E.: *See*—
Acampora, Anthony; and Langseth, Rollin E., 4,232,197, Cl. 370-97.000.

Lannen Tehtaat Oy: *See*—
Ruuska, Mauno, 4,231,186, Cl. 47-74.000.

LaPierre, Rene B.: *See*—
Chang, Clarence D.; Lang, William H.; and LaPierre, Rene B., 4,231,955, Cl. 260-465.100.

Lark S.p.A.: *See*—
Palladino, Gaetano; and Micciarelli, Mario, 4,232,013, Cl. 424-241.000.

Larsen, Hans-Ole: *See*—
Sorensen, Erik L.; and Larsen, Hans-Ole, 4,231,369, Cl. 128-283.000.

Larson, Olaf A.; and Matthews, Charles W., to Gulf Oil Corporation. Consolidation of in-situ retort. 4,231,617, Cl. 299-2.000.

Lastinger, Anthony W.: *See*—
Whitfield, Carroll J.; and Lastinger, Anthony W., 4,231,433, Cl. 172-662.000.

Laub, Bernard: *See*—
Rolinski, Edmund J.; and Laub, Bernard, 4,231,248, Cl. 73-15.600.

Laud, Kamlakar R.: *See*—
Logothetis, Eleftherios M.; Laud, Kamlakar R.; and Park, John K., 4,231,254, Cl. 73-362.0AR.

Laurel Bank Machine Co., Ltd.: *See*—
Miyagawa, Tuyoshi; and Arikawa, Junichi, 4,231,564, Cl. 271-95.000.

Laurita, Joseph N. Foldable ladder. 4,231,449, Cl. 182-164.000.

Lauterbach, John H. F.: *See*—
Hughes, Donald W. K.; and Lauterbach, John H. F., 4,231,628, Cl. 339-17.0LC.

Lavin, Walter M.; McFarlane, James I.; and Rose, Dennis L., to Betz Laboratories, Inc. Stabilized alkali metal bisulfite or sulfite-catalyzed solutions. 4,231,894, Cl. 252-389.00A.

Lawless, William N., to Corning Glass Works. Cryogenic ceramic and apparatus. 4,231,231, Cl. 62-514.00R.

Lawrence, Larry D.: *See*—
Sudweeks, Walter B.; and Lawrence, Larry D., 4,231,821, Cl. 149-21.000.

Lazardwitz, Benjamin: *See*—
Weiss, Gerald; Scharf, Gerson; Guido, Anthony A.; and Lazardwitz, Benjamin, 4,232,187, Cl. 178-22.000.

Lazaroff, Gary G. Spray washer system. 4,231,239, Cl. 68-205.00R.

Le-Bo Products Co., Inc.: *See*—
Aprahamian, Vaughn, 4,231,473, Cl. 206-387.000.

Leanza, William J.: *See*—
Christensen, Burton G.; Leanza, William J.; and Wildonger, Kenneth J., 4,232,030, Cl. 424-263.000.

Learn, William H. Projectable step for vehicles. 4,231,583, Cl. 280-166.000.

Leber, Dieter, to VDO Adolf Schindling AG. Apparatus for continuous measurement of the liquid level in a container. 4,231,250, Cl. 73-290.00V.

Lechner, Robert H.: *See*—
DeLacy, James P.; and Lechner, Robert H., 4,232,232, Cl. 307-139.000.

Lecky, John H.: *See*—
Boehringer, John R.; and Lecky, John H., 4,231,375, Cl. 128-725.000.

Lectron Products, Inc.: *See*—
Slavin, Michael; and Telmet, Juhan, 4,232,287, Cl. 340-52.00E.

Lee, Maw H.; and Keim, John E., to Scott & Fetzer Company, The. Wireless alarm system. 4,232,308, Cl. 340-539.000.

Lee, Minyoung: *See*—
DeVries, Robert C.; Lee, Minyoung; Szala, Lawrence E.; and Tuft, Roy E., 4,231,195, Cl. 51-307.000.

Lee, Ross A., to Du Pont de Nemours, E. I., and Company. Bleachable photographic sensitizing dyes. 4,232,115, Cl. 430-522.000.

Leeds and Northrup Ltd.: *See*—
Bradshaw, Michael; and Edwards, Roger D., 4,232,325, Cl. 346-76.00R.
Leggett & Platt, Incorporated: *See*—
Sandham, Edwin C., 4,231,539, Cl. 248-418.000.
Leiber, Heinz, to Robert Bosch GmbH. Anti-lock apparatus for a hydraulic brake system. 4,231,620, Cl. 303-119.000.
Leidich, Arthur J., to RCA Corporation. PNP Output short circuit protection. 4,232,273, Cl. 330-298.000.
Leipelt, Rudolf: *See*—
Alf, Herbert; Ernst, Volker; Hainle, Rudi; and Leipelt, Rudolf, 4,231,343, Cl. 123-556.000.
Leitch, Clifford D., to Harris Corporation. AM Stereo receivers. 4,232,189, Cl. 179-1.00G.
Lelaidier, Daniel; and Godard, Pierre, to Saft-Societe des Accumulateurs Fixes et de Traction. System for controlling an electronic warning device. 4,232,305, Cl. 340-384.00E.
Lemercier, Pierre: *See*—
Balligand, Pierre; Corfa, Yves; Lemercier, Pierre; Marchal, Paul; and Vertut, Jean, 4,231,171, Cl. 37-54.000.
Lenaerts, George V., to Northern Telecom Limited. Integral telephone set and handset. 4,232,203, Cl. 179-103.000.
Leon, Gordon T.; and Byron, Joseph L., to Berkey-Colortran, Inc. Spotlight or other illuminator. 4,232,359, Cl. 362-268.000.
Lerner, Marshall A.: *See*—
Lipski, Frank F., 4,231,241, Cl. 70-195.000.
Lesko, Imre A.: *See*—
Gorenc, Edward J.; Fox, Ulles E.; and Lesko, Imre A., 4,231,246, Cl. 72-412.000.
Lesteva, Tatyana M.: *See*—
Liakumovich, Alexandr G.; Pantukh, Boris I.; and Lesteva, Tatyana M., 4,232,182, Cl. 585-820.000.
Lever Brothers Company: *See*—
Machin, David, 4,231,904, Cl. 252-557.000.
Levitt, George, to Du Pont de Nemours, E. I., and Company. Herbicidal sulfonamides. 4,231,784, Cl. 71-92.000.
Levy, John V.; Rodgers, David P.; Stewart, Robert E.; and Casabona, Richard J., to Digital Equipment Corporation. Bus for a data processing system with overlapped sequences. 4,232,366, Cl. 364-200.000.
Lewellyn, Morris E.: *See*—
Wang, Samuel S.; and Lewellyn, Morris E., 4,231,868, Cl. 210-728.000.
Lewis, Frank M., to Wright Dow Corning. Metacarpal-phalangeal prosthesis. 4,231,121, Cl. 3-1.910.
Lewis, Ronnie L.: *See*—
Irvin, Howard B.; Lewis, Ronnie L.; and Moczygemba, George A., 4,232,137, Cl. 526-71.000.
Ley, Anthony J., to ENERTEC. Remotely-controllable relays and filters therefor. 4,232,298, Cl. 340-171.00R.
Liakumovich, Alexandr G.; Pantukh, Boris I.; and Lesteva, Tatyana M. Process for purifying isoprene. 4,232,182, Cl. 585-820.000.
Liakumovich, Alexandr G.: *See*—
Adigamov, Engel R.; Gurvich, Yakov A.; Liakumovich, Alexandr G.; Logutov, Igor J.; Michurov, Jury I.; Polenov, Alexei S.; and Yanshevsky, Vladimir A., 4,232,176, Cl. 568-756.000.
Libbey-Owens-Ford Company: *See*—
Krueger, Wallace F.; and Shaw, Anthony R., 4,231,204, Cl. 52-397.000.
Shaw, Anthony R.; Krueger, Wallace F.; and Bastian, Lloyd E., 4,231,505, Cl. 228-14.000.
Licentia Patent-Verwaltungs-GmbH: *See*—
Schaffernicht, Klaus; and Kolbeck, Rainer, 4,231,627, Cl. 316-25.000.
Lidaka, Marger J.: *See*—
Paegle, Ruta A.; Lidaka, Marger J.; Zhuk, Regina A.; Maurinsh, Juris A.; Zidermane, Aina A.; and Kilevitsa, Marite K., 4,232,149, Cl. 536-23.000.
Lieberman, Aaron L. Laminated frame assembly and process. 4,231,833, Cl. 156-249.000.
Limburg, William W.; and Pai, Damodar M., to Xerox Corporation. Phenyl benzotriazole stabilized photosensitive device. 4,232,103, Cl. 430-59.000.
Limone, Mario; Russo, Giovanni; Magliuolo, Umberto; and Sardella, Salvatore. Card comprising an electronic circuit with obliterable credit elements for the distribution of goods or services. 4,231,458, Cl. 194-4.00F.
Lin, Ching-Yu: *See*—
Hickam, William M.; Lin, Ching-Yu; and Zomp, John M., 4,231,733, Cl. 431-76.000.
Linde AG: *See*—
Wagner, Norbert, 4,231,508, Cl. 228-219.000.
Lindemann, Martin K. O.; and Verdicchio, Robert J., to Johnson & Johnson. Detergent compositions. 4,231,903, Cl. 252-545.000.
Lindkvist, Folke: *See*—
Dahle, Orvar; Einarsson, Olov; Lindkvist, Folke; and Valdemarsson, Stefan, 4,231,145, Cl. 29-432.000.
Lindstedt, Guenter: *See*—
Gerlach, Albrecht; Holzmann, Dieter; Lindstedt, Guenter; and Burth, Rolf-Dieter, 4,232,297, Cl. 340-168.00S.
Ling, Alexander C.: *See*—
McDonald, John C.; Baichtal, James R.; and Ling, Alexander C., 4,232,386, Cl. 370-68.000.
Ling Systems Limited: *See*—
Arscott, John R., 4,231,469, Cl. 198-779.000.
Lingstaedt, Ernst; Moegen, Gerhard; and Wotruba, Gottfried, to Eurosil GmbH. MOS Control circuit for integrated circuits. 4,232,261, Cl. 323-22.00R.
Linneborn, Hans, to Neuhaus-Schwermann, Albert; and Zerbin, Walter Otto. Apparatus and process for burning of fuels of relatively young geological age and of any resulting gases. 4,231,302, Cl. 110-229.000.
Linse, Vonne D.: *See*—
Istvanffy, Stephen M.; and Linse, Vonne D., 4,231,506, Cl. 228-109.000.
Lintell, Robert J.; and Campbell, James D., to United States of America, Air Force. Active optical tracking system. 4,231,534, Cl. 244-3.160.
Lipp, George D., to Corning Glass Works. Electrically heated surgical cutting instrument. 4,231,371, Cl. 128-303.100.
Lipps, Bennie J.; Murphy, William P., Jr.; and Mather, Frank W., III, to Cordis Dow Corp. Artificial kidney and method for making same. 4,231,871, Cl. 210-87.000.
Lipski, Frank F., to Lerner, Marshall A., trustee of Henry Bissell, a part interest. Vehicle shifter locking device. 4,231,241, Cl. 70-195.000.
Lithgow, Keith B., to Microform Communications Limited. Clamping devices. 4,231,538, Cl. 248-226.100.
Litmanovich, Ilya M.: *See*—
Kuznetsov, Vyacheslav D.; Preobrazhensky, Boris P.; Rozhnov, Valentin E.; Stepanov, Jury V.; Belitsky, Anatoly N.; Beizer, Viktor N.; Tokar, Grigory A.; Plastovets, Ivan K.; Barylo, Ivan I.; Koval, Boris A.; Chepurnykh, Sergei F.; Chumachenko, Petr N.; Simonov, Nikolai F.; Kharkhardin, Petr P.; and Litmanovich, Ilya M., 4,231,860, Cl. 209-169.000.
Livesay, Keith. Fireplace heat exchanger unit. 4,231,349, Cl. 126-121.000.
Ljungqvist, Stig-Ove E.; Hammarstrom, Bernth S.; and Fritjofsson, Sture F. E., to Gislaved AB. System for automatic joining and rolling up of cord strips. 4,231,836, Cl. 156-405.00P.
Loewenstern, Kenneth M.: *See*—
Wright, William S.; and Loewenstern, Kenneth M., 4,232,300, Cl. 340-840.390.
Logan, Arthur D.: *See*—
Ensley, Rufus N.; Haren, Doyle V.; Logan, Arthur D.; and McLean, Michael E., 4,231,835, Cl. 156-361.000.
Logan, David J., to Gerber Scientific Instrument Company, The. Method of making an overlay mask and a printing plate therefrom. 4,231,659, Cl. 355-132.000.
Logothetis, Eleftherios M.; Laud, Kamlakar R.; and Park, John K., to Ford Motor Company. Rare earth or yttrium, transition metal oxide thermistors. 4,231,254, Cl. 73-362.0AR.
Logutov, Igor J.: *See*—
Adigamov, Engel R.; Gurvich, Yakov A.; Liakumovich, Alexandr G.; Logutov, Igor J.; Michurov, Jury I.; Polenov, Alexei S.; and Yanshevsky, Vladimir A., 4,232,176, Cl. 568-756.000.
Loiler, Roger D., to JMR Instruments, Inc. Receiver for satellite navigational positioning system. 4,232,389, Cl. 455-12.000.
Lomard, Jean-Pierre, to Societe Anonyme dite: CM Industries. Method for the treatment of male sterility. 4,232,019, Cl. 424-248.560.
Lombard, Jean-Pierre, to C M Industries. Process for the treatment of children suffering from a hyperkinetic syndrome. 4,232,020, Cl. 424-248.560.
Lonati, Francesco. Device for advancing the main drum in a circular knitting machine. 4,231,235, Cl. 66-236.000.
Longerich, Ernest P., to United States of America, Navy. Towable pod assembly for protectively disabling incoming torpedoes. 4,231,311, Cl. 114-244.000.
Looney, Donald F.: *See*—
Derrick, Danny O.; and Looney, Donald F., 4,231,141, Cl. 24-243.00K.
Lord Corporation: *See*—
Koeneman, James B., 4,231,122, Cl. 3-1.911.
Lorenz, Kurt: *See*—
Weber, Heinrich; Lorenz, Kurt; Dungs, Horst; Kurtz, Roman; and Kersting, Hans-Joachim, 4,231,844, Cl. 201-34.000.
Loubier, Roger C.: *See*—
Petterson, Robert C.; and Loubier, Roger C., 4,231,804, Cl. 134-11.000.
Petterson, Robert C.; and Loubier, Roger C., 4,231,805, Cl. 134-11.000.
Louthan, Rector P., to Phillips Petroleum Company. Preparation of alkyl mercaptocarboxylate/dialkyl thiodicarboxylate mixture using sulfur and/or water cocatalyst. 4,232,167, Cl. 560-154.000.
Lubrizol Corporation, The: *See*—
Davis, Kirk E., 4,231,757, Cl. 44-63.000.
Lucas, Frank J. Lawn mower safety device. 4,231,217, Cl. 56-17.400.
Lucas Industries Limited: *See*—
Hill, William F.; and Southgate, John P., 4,232,368, Cl. 364-431.000.
Reed, Kenneth R. B., 4,232,231, Cl. 307-10.00R.
Luddington, Eric A.: *See*—
Hinchcliffe, Dennis; Heybourn, Frank; and Luddington, Eric A., 4,231,461, Cl. 198-347.000.
Lugscheider, Erich: *See*—
Kruske, Gerhard; Knotek, Otto; and Lugscheider, Erich, 4,231,793, Cl. 75-122.000.
Lui, Kenneth, to TRW Inc. Electrodeposition of nickel-iron alloys having a low temperature coefficient and articles made therefrom. 4,231,847, Cl. 204-7.000.
Luke, Roger D.; and Rhodes, John M., to Gould Inc. Neutral bar, lug and barrier assembly. 4,231,633, Cl. 339-242.000.
Lummus Company, The: *See*—
Riegel, Herbert, 4,231,969, Cl. 570-223.000.

Lund, Arvid, to Rader Companies, Inc. Rotary feeder for pneumatic conveying line. 4,231,495, Cl. 222-345.000.

Lunn, William H. W.: *See*—
Nagata, Wataru; Hamashima, Yoshio; Tsuji, Teruji; and Lunn, William H. W., 4,232,151, Cl. 544-90.000.

Lynch, Brian; and Partus, Fred P., to Western Electric Company, Inc. Methods of and apparatus for heating a glass tube. 4,231,777, Cl. 65-109.000.

Lyon, Warren C.; and Hayes, William H., Jr., to Hittman Corporation. Pressure sensor. 4,231,376, Cl. 128-748.000.

Lyons, Michael T., to Satellite Business Systems. Satellite-launch vehicle combination and method. 4,231,537, Cl. 244-160.000.

M & T Chemicals Inc.: *See*—
Dworkin, Robert D., 4,231,895, Cl. 252-400.00A.

MacDonald, David J., to United States of America, Interior. Separation of zirconium from hafnium by solvent extraction. 4,231,994, Cl. 423-70.000.

MacGregor, Daniel. Extract of energy from the sea. 4,231,711, Cl. 417-100.000.

Machin, David, to Lever Brothers Company. Detergent bars with improved properties. 4,231,904, Cl. 252-557.000.

Macias, Julian W.: *See*—
Rennick, Lyle V.; and Macias, Julian W., 4,232,381, Cl. 367-135.000.

Mack, Ronald H.: *See*—
Juziuk, Jurgen A.; Mack, Ronald H.; Banka, Eugene F.; and Nicol, Edward A., 4,232,217, Cl. 235-480.000.

Mader, William L. Releasable animal hitching apparatus. 4,231,327, Cl. 119-110.000.

Maechtle, Gary L.: *See*—
Carlstrom, William L.; and Maechtle, Gary L., 4,232,085, Cl. 428-315.000.

Magane, Shigeo; and Yamamoto, Kazuo, to NSK-Warner K.K. Safety belt system for vehicles. 4,231,590, Cl. 280-803.000.

Magdanyi, Laszlo: *See*—
Kovacsay, Istvan; Szajko nee Lorinczi, Maria; Dubovszky, Istvan; Magdanyi, Laszlo; Szailer, Ferenc; and Szatmari, Ede, 4,232,136, Cl. 525-327.000.

Magerlein, Barney J., to Upjohn Company, The. 6-Deoxyneamines. 4,232,148, Cl. 536-17.00R.

Magiera, Leonhardt; Grundmann, Raban; and Krockenberger, Dieter, to Chemische Werke Huls Aktiengesellschaft. Stabilization of 1,1,1-trichloroethane. 4,231,968, Cl. 570-109.000.

Magliuolo, Umberto: *See*—
Limone, Mario; Russo, Giovanni; Magliuolo, Umberto; and Sardella, Salvatore, 4,231,458, Cl. 194-4.00F.

Magnusson, Ulf S. G.; and Uhrbom, Lars E., to Nordiska Ackumulatorfabriker Noack AB. Electrode plate for lead accumulators. 4,232,100, Cl. 429-217.000.

Mainetti, Mario, to S.A. Mainetti. Clothes hanger. 4,231,500, Cl. 223-96.000.

Maki, Douglas W.: *See*—
Dickens, Lawrence E.; and Maki, Douglas W., 4,232,277, Cl. 331-107.0DP.

Makino, Koichi: *See*—
Hattori, Seizi; Makino, Koichi; Nakagawa, Takehiko; and Shinohara, Masayoshi, 4,232,061, Cl. 427-130.000.

Makins, James E., Jr., to United States Steel Corporation. Eccentric shaft and method of making a shaft. 4,231,671, Cl. 403-13.000.

Maklad, Mokhtar S., to International Telephone and Telegraph Corporation. Method of fabricating large optical preforms. 4,231,774, Cl. 65-3.00A.

Makowski, Lawrence A.: *See*—
Wotton, David R.; Dickerson, Carroll D.; and Makowski, Lawrence A., 4,231,588, Cl. 280-661.000.

Maladra, Anthony: *See*—
Campanella, Matthew J.; Maladra, Anthony; and Goldberg, Bennett C., 4,231,511, Cl. 235-375.000.

Malburg, Werner, to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung. Pulsating liquid jet gun and method of operating the same. 4,231,283, Cl. 89-8.000.

Malec, Robert E., to Ethyl Corporation. Lubricant composition. 4,231,883, Cl. 252-33.400.

Mallory, Glenn O., Jr., to Richardson Chemical Company. Method of preparing substrate surface for electroless plating and products produced thereby. 4,232,060, Cl. 427-98.000.

Malone, Carl E. Container depressurization system. 4,231,489, Cl. 220-304.000.

Malpass, Dennis B., to Texas Alkyls, Inc. Organomagnesium complexes. 4,231,896, Cl. 252-431.00R.

Manfroni, Ezio, to Carpigiani Bruto Macchine Automatiche S.p.A. Dispensing valve for liquids. 4,231,547, Cl. 251-210.000.

Mann, George F. Method of producing plasminogen activator. 4,232,124, Cl. 435-212.000.

Mann, John: *See*—
Orr, Thomas S. C.; Hall, David E.; and Mann, John, 4,232,012, Cl. 424-232.000.

Manning, Robert G.: *See*—
Rule, Charles E.; Manning, Robert G.; and Zielinski, Richard J., 4,232,050, Cl. 426-582.000.

Mansson, Staffan T.: *See*—
Brandt, Lennart H.; and Mansson, Staffan T., 4,231,317, Cl. 440-50.000.

Manufacture de Produits Chimiques Protex Societe Anonyme: *See*—
Balland, Jean, 4,231,749, Cl. 8-584.000.

Marathe, Vijay V.: *See*—
Heinsen, Edward A.; and Marathe, Vijay V., 4,232,382, Cl. 368-1.000.

Marcantonio, Arnold F.; and Dailey, Rodney E., to Ball Corporation. Aqueous metal coordination compounds as protective coatings for glass. 4,232,065, Cl. 427-226.000.

Marchal, Paul: *See*—
Balligand, Pierre; Corfa, Yves; Lemercier, Pierre; Marchal, Paul; and Vertut, Jean, 4,231,171, Cl. 37-54.000.

Marchesano, Carlo, to Minnesota Mining and Manufacturing Company. Liquid concentrated developer composition, and confection ready to mix with water including it, for use in color photography. 4,232,113, Cl. 430-450.000.

Marconi Company Limited, The: *See*—
Gerard, Roger E. J., 4,232,193, Cl. 179-1.50R.

Marey, Daniel J.: *See*—
Ayache, Michel R.; Delonge, Jean-Claude L.; and Marey, Daniel J., 4,231,704, Cl. 416-95.000.

Margolin, George D.: *See*—
Bell, Vincent G., Jr.; Burke, Thomas P.; Margolin, George D.; and Vurpillat, Victor V., 4,231,593, Cl. 283-6.000.

Marion Laboratories, Inc.: *See*—
Mathison, Ian W.; and Solomons, William E., 4,232,014, Cl. 424-324.000.

Mark Controls Corporation: *See*—
Johnson, Allan B., 4,231,512, Cl. 236-47.000.

Mark, Victor; and Hedges, Charles V., to General Electric Company. Transparent to translucent flame-retardant polycarbonate composition. 4,231,920, Cl. 260-45.70S.

Marky, Michael, to Ciba-Geigy Corporation. Phosphonium compounds, a process for their preparation and a process for the preparation of asymmetrically substituted stilbene fluorescent brightening agents. 4,231,957, Cl. 260-505.00C.

Marmet, Melvin L.; and Padgett, Clarence W., to Rockwell International Corporation. High gain differential amplifier with positive feedback. 4,232,270, Cl. 330-253.000.

Marquez, Joseph A.: *See*—
Taplin, David; Weinstein, Marvin J.; Testa, Raymond T.; Marquez, Joseph A.; and Patel, Mahesh G., 4,232,006, Cl. 424-177.000.

Marquis, David M.: *See*—
Paradis, Stephen G.; Marquis, David M.; and Bakshi, Kiran R., 4,231,943, Cl. 260-346.750.

Marquisee, Mark J., to Du Pont de Nemours, E. I., and Company. Nontacky shaped objects from polymer latices. 4,232,126, Cl. 521-65.000.

Mars Limited: *See*—
Compton, Peter A.; and Wood, John G., 4,231,476, Cl. 206-519.000.

Marsh, Dean E. Hot water boiler. 4,231,350, Cl. 126-133.000.

Marsocci, Angelo A., to American District Telegraph Company. Electrical test circuit for optical particle detector. 4,232,307, Cl. 340-515.000.

Martel, Jacques; Tessier, Jean; and Demoute, Jean-Pierre, to Roussel Uclaf. Phthalimidomethyl cyclopropane carboxylic acid esters. 4,231,932, Cl. 260-326.00A.

Martin, David G., to Upjohn Company, The. Purification of AT-125. 4,232,164, Cl. 548-240.000.

Martin, Frank E., to Midori Anzen Company, Ltd. Personal emergency breathing hood with nose blocking device. 4,231,359, Cl. 128-201.180.

Martin, Jerry R.: *See*—
Tadanier, John S.; Martin, Jerry R.; and Kurath, Paul, 4,231,924, Cl. 260-112.50R.
Tadanier, John S.; and Martin, Jerry R., 4,232,147, Cl. 536-4.000.

Martin, Raul: *See*—
Gomez, Nicolas Q.; and Martin, Raul, 4,231,199, Cl. 52-91.000.

Martin, Richard H.: *See*—
Cline, Warren K.; and Martin, Richard H., 4,231,377, Cl. 131-9.000.

Martin, Robert F.: *See*—
Burke, Robert G.; and Martin, Robert F., 4,232,294, Cl. 340-147.0LP.

Marty, Didier; Abadie, Albert; and Mustin, Michel. Process for preparation of a water for hemodialysis, and its application in renal hemodialysis. 4,231,864, Cl. 210-669.000.

Marui, Toshio; and Masuda, Masuo, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Process of transfer printing. 4,231,829, Cl. 156-230.000.

Maruyama, Eiichi: *See*—
Yamamoto, Hideaki; Tsukada, Toshihisa; Maruyama, Eiichi; and Inagaki, Hiroya, 4,232,219, Cl. 250-227.000.

Maruzen Sewing Machine Co., Ltd: *See*—
Matsumura, Nobuyoshi, 4,232,258, Cl. 318-345.00H.

Marx, Dieter: *See*—
Poetsch, Eike; Uhl, Jurgen; Marx, Dieter; Strehlow, Wighard; Muller-Calgan, Helmut; and Dolce, Giuliano, 4,232,016, Cl. 414-244.000.

Masaki, Kenji: *See*—
Suzuki, Suzuo; Nagaishi, Hastuo; and Masaki, Kenji, 4,231,331, Cl. 123-416.000.

Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft: *See*—
Griepentrog, Hartmut, 4,231,226, Cl. 60-648.000.
Zurner, Hansjurgen; and Fuhrmann, Wolfgang, 4,231,543, Cl. 251-57.000.

Mascioli, Rocco L.: *See*—
Bechara, Ibrahim S.; Mascioli, Rocco L.; and Zaluska, Philip J., 4,232,152, Cl. 544-119.000.

Mashimo, Norio: *See*—
Mori, Yoshihisa; Mashimo, Norio; and Eguchi, Takeo, 4,232,202, Cl. 179-100.40E.
Mason, Keith J.: *See*—
Swersky, Gerald S.; and Mason, Keith J., 4,231,437, Cl. 175-325.000.
Massachusetts Institute of Technology: *See*—
Raffel, Jack I.; and Bernacki, Stephen E., 4,231,819, Cl. 148-175.000.
Schrock, Richard R., 4,231,947, Cl. 260-429.00R.
Mastalish, Lawrence V.: *See*—
Pierson, Roger P.; Mastalish, Lawrence V.; and Zollar, Daniel J., 4,231,491, Cl. 221-48.000.
Masterman, Raymond J. Vehicle alarm. 4,232,288, Cl. 340-63.000.
Masuda, Masuo: *See*—
Marui, Toshio; and Masuda, Masuo, 4,231,829, Cl. 156-230.000.
Matchette, Gerald J. Saw guide assembly. 4,231,274, Cl. 83-820.000.
Mather, Frank W., III: *See*—
Lipps, Bennie J.; Murphy, William P., Jr.; and Mather, Frank W., III, 4,231,871, Cl. 210-87.000.
Mathiak, Hans; and Oldengott, Hans, to Ruhrkohle, AG. Plug for protecting coke-oven chamber doors from the action of the internal temperature in the oven. 4,231,846, Cl. 202-248.000.
Mathison, Ian W.; and Solomons, William E., to Marion Laboratories, Inc. Aminoalkylindans and use as hypotensive agents. 4,232,014, Cl. 424-324.000.
Mathner, Manfred; and Thomsen, Peter, to Dolmar Maschinenfabrik GmbH & Co. Exhaust silencer for exhaust systems of internal combustion engines, particularly internal combustion engine-operated manual appliances. 4,231,221, Cl. 60-319.000.
Matsuda, Teruo; and Murata, Tetsuo, to Sumitomo Chemical Company, Limited. Process for producing salicylaldehyde. 4,231,967, Cl. 568-433.000.
Matsuda, Wakatake: *See*—
Terada, Akira; Hattori, Seizi; Ishii, Yoshikazu; Nohara, Akira; Inagaki, Nobuo; Matsuda, Wakatake; and Kawakami, Susumu, 4,232,071, Cl. 428-64.000.
Matsumoto, Hiromitsu; and Sugiyama, Keiichi, to Yamaha Hatsukoko Kabushiki Kaisha. Control device for exhaust gas recycled internal combustion engine. 4,231,339, Cl. 123-568.000.
Matsumura, Nobuyoshi, to Maruzen Sewing Machine Co., Ltd. Speed control apparatus for electric motor. 4,232,258, Cl. 318-345.00H.
Matsuo, Koji: *See*—
Taguchi, Nobuyoshi; Matsuo, Koji; Takahashi, Hiromu; and Oda, Fujio, 4,232,213, Cl. 219-216.000.
Matsushita Electric Industrial Co., Ltd.: *See*—
Murakami, Kaoru; Okahisa, Mitsugu; Arita, Tomohiko; and Kumano, Hiroshi, 4,231,889, Cl. 252-182.100.
Nakagawa, Hiroshi; Kawa, Hidetoshi; and Kawai, Makoto, 4,232,335, Cl. 358-101.000.
Ochi, Matsuo; and Miyoshi, Keisuke, 4,232,247, Cl. 313-474.000.
Taguchi, Nobuyoshi; Matsuo, Koji; Takahashi, Hiromu; and Oda, Fujio, 4,232,213, Cl. 219-216.000.
Matsuura, Shigeo: *See*—
Murata, Toshinori; and Matsuura, Shigeo, 4,232,397, Cl. 455-179.000.
Matsuzuka, Takeshi, to Trio Kabushiki Kaisha. FM Receiving device. 4,232,191, Cl. 179-1.0GD.
Mattern, Gunter: *See*—
Boger, Manfred; Drabek, Jozef; Mattern, Gunter; and Traber, Walter, 4,232,011, Cl. 424-200.000.
Matthews, Charles W.: *See*—
Larson, Olaf A.; and Matthews, Charles W., 4,231,617, Cl. 299-2.000.
Mattia, Manlio M. System for removing organic contaminants from air. 4,231,764, Cl. 55-28.000.
Matuska, Tibor L., to Unaform, Inc. Fabric for papermaking machines. 4,231,401, Cl. 139-383.00A.
Mauldin, Charles H.; and Baird, William C., Jr., to Exxon Research & Engineering Co. Reforming with multimetallic catalysts. 4,231,898, Cl. 252-441.000.
Mauri, Luigi: *See*—
Bordini, Fosco; and Mauri, Luigi, 4,232,089, Cl. 428-413.000.
Maurinsh, Juris A.: *See*—
Paegle, Ruta A.; Lidaka, Marger J.; Zhuk, Regina A.; Maurinsh, Juris A.; Zidermane, Aina A.; and Kilevitsa, Marite K., 4,232,149, Cl. 536-23.000.
Maurischat, Gunther: *See*—
Waibel, Gottfried; Maurischat, Gunther; and Webersik, Heinz, 4,231,319, Cl. 118-655.000.
MAXS Aktiengesellschaft: *See*—
Zimmermann, Anton; and Greutert, Albert, 4,231,876, Cl. 210-232.000.
Maxwell, Donald R.: *See*—
Poschel, Bruno P. H.; and Maxwell, Donald R., 4,232,021, Cl. 424-250.000.
Mayhew, Harry E.: *See*—
Schlegel, William R.; and Mayhew, Harry E., 4,231,535, Cl. 244-110.00C.
Mazzacano, Paul J.: *See*—
Smith, Dennis W.; and Mazzacano, Paul J., 4,231,676, Cl. 404-6.000.
MCA Disco-Vision, Inc.: *See*—
Isailovic, Jordan, 4,232,388, Cl. 375-110.000.
MCA Discovision, Inc.: *See*—
Canino, Lawrence S., 4,232,201, Cl. 179-100.10G.
Winslow, John S.; and Wilkinson, Richard L., 4,232,337, Cl. 358-128.500.
McBride, Donald G.: *See*—
Gazdik, Charles E.; and McBride, Donald G., 4,231,154, Cl. 29-840.000.
McCarter, Ed R.: *See*—
Thatcher, Arthur K.; and McCarter, Ed R., 4,231,333, Cl. 123-440.000.
McCombie, Stuart, to Schering Corporation. S-5-(Azidomethyl or aminomethyl)-2-lower-alkoxytetrahydrofurans. 4,231,945, Cl. 260-347.700.
McConnell, George B., to Data Information Systems Corporation. Jukebox polling system. 4,232,295, Cl. 340-152.00R.
McCue, Bernard B., to RCA Corporation. Internal metal stripe on conductive layer. 4,232,248, Cl. 313-479.000.
McDonald, John C.; Baichtal, James R.; and Ling, Alexander C., to TRW Inc. Subscriber switch controller for controlling connections between a plurality of telephone subscriber lines and a pair of multitime-slot digital data buses. 4,232,386, Cl. 370-68.000.
McElheny, Donald C., to American Precision Industries, Inc. Method of connecting wire leads to miniature coil assemblies. 4,231,985, Cl. 264-262.000.
McEvilly, Richard V., Jr. Mobile radio vehicle control system. 4,232,390, Cl. 455-77.000.
McFarlane, James I.: *See*—
Lavin, Walter M.; McFarlane, James I.; and Rose, Dennis L., 4,231,894, Cl. 252-389.00A.
McGee, Thomas W.: *See*—
Smith, William E.; and McGee, Thomas W., 4,232,175, Cl. 568-706.000.
McGinley, Emanuel J.; and Zuban, Joseph M., to FMC Corporation. Method of mixing difficulty dispersible material, e.g., fat or wax, in a gum-microcrystalline cellulose matrix, and powder product. 4,231,802, Cl. 106-197.00C.
McGraw-Edison Company: *See*—
Kelsall, Jeffrey C., 4,232,361, Cl. 362-364.000.
McGuire, John J.; and Auger, Edward J. Method and system for propagating of plants. 4,231,188, Cl. 47-80.000.
McLean, Michael E.: *See*—
Ensley, Rufus N.; Haren, Doyle V.; Logan, Arthur D.; and McLean, Michael E., 4,231,835, Cl. 156-361.000.
McMillan, Stephen L., to General Electric Company. Automatic control for a clothes dryer. 4,231,166, Cl. 34-48.000.
McQuillin, Brian: *See*—
Middleton, Anthony E.; and McQuillin, Brian, 4,231,701, Cl. 414-730.000.
McSwain, Edward D. Automatic ventilator. 4,231,514, Cl. 236-49.000.
Mead Corporation, The: *See*—
Gebhardt, James L.; and Hutchins, Ferris L., Jr., 4,231,299, Cl. 108-91.000.
Gebhardt, James L., 4,231,831, Cl. 156-233.000.
Meeker, Paul K., to Questor Corporation. Baby carrier and car seat. 4,231,612, Cl. 297-250.000.
Meisel, Fritz. Hot-stamping film, and process and apparatus for its manufacture. 4,232,077, Cl. 428-174.000.
Mengoli, Giuliano; Daolio, Sergio; Giulio, Ugo; and Folonari, Carlo, to Centro Ricerche Fiat S.p.A.; and Consiglio Nazionale Delle Ricerche. Method for electrochemically coating a metallic substrate with a protective film of a phenolic resin. 4,231,851, Cl. 204-181.00R.
Menju, Shinichi; Takahashi, Kunio; Haginomori, Eiichi; Murakami, Yoichi; and Zaima, Eiichi, to Tokyo Shibaura Denki Kabushiki Kaisha; and Tokyo Denryoku Kabushiki Kaisha. Method and apparatus for detecting foreign matters in gas sealed electric apparatus. 4,231,258, Cl. 73-572.000.
Menju, Shinichi; Ohshima, Iwao; and Takahashi, Shigeru, to Tokyo Shibaura Denki Kabushiki Kaisha. Protective gap devices for protecting circuit breakers. 4,232,352, Cl. 361-120.000.
Menocal, Gustavo A., to Gould Inc. Circuit breaker having means to facilitate assembly thereof. 4,232,282, Cl. 335-202.000.
Menzel, Gerhard: *See*—
Kaufhold, Manfred; Hepp, Dieter; and Menzel, Gerhard, 4,231,915, Cl. 260-31.80R.
Merceron, Daniel: *See*—
Badoz, Jean-Marie; and Merceron, Daniel, 4,231,632, Cl. 339-97.00R.
Merck & Co., Inc.: *See*—
Christensen, Burton G.; Leanza, William J.; and Wildonger, Kenneth J., 4,232,030, Cl. 424-263.000.
Christensen, Burton G.; and Shih, David H., 4,232,036, Cl. 424-274.000.
Monaghan, Richard L.; Alberts, Alfred W.; Hoffman, Carl H.; and Albers-Schonberg, George, 4,231,938, Cl. 260-343.500.
Shepard, Kenneth L.; and Brenner, Daniel G., 4,232,158, Cl. 546-72.000.
ten Broeke, Jan, 4,232,026, Cl. 424-258.000.
Merck Patent Gesellschaft mit beschraenkter Haftung: *See*—
Poetsch, Eike; Uhl, Jurgen; Marx, Dieter; Strehlow, Wighard; Muller-Calgan, Helmut; and Dolce, Giuliano, 4,232,016, Cl. 414-244.000.
Merisio, Alberto, to Somet Societa Meccanica Tessile, S.p.A. Drawing gripper for weaving looms. 4,231,402, Cl. 139-448.000.
Merkle, Theodor; Hausenblas, Bernhard; Schweickert, Hermann; and Wengert, Dieter, to J. M. Voith GmbH. Pipe joint structure. 4,231,594, Cl. 285-3.000.

Merten, Josef: *See—*
Grigo, Ulrich; Merten, Josef; and Binsack, Rudolf, 4,232,132, Cl. 525-222.000.
Meseguer, Jose D.: *See—*
Coll, Antonio L. P.; and Meseguer, Jose D., 4,232,162, Cl. 548-111.000.
Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung: *See—*
Malburg, Werner, 4,231,283, Cl. 89-8.000.
Metallgesellschaft Aktiengesellschaft: *See—*
Kruske, Gerhard; Knotek, Otto; and Lugscheider, Erich, 4,231,793, Cl. 75-122.000.
Metallurgical Processes Ltd.: *See—*
Charles, James A., 4,231,791, Cl. 75-9.000.
Meyer, Andreas: *See—*
Remy, Ernst; Meyer, Andreas; and Rieske, Ellen, 4,231,660, Cl. 356-244.000.
Meyer-Kahrweg, Helmut, to Steag A.G. Flare gas limiting apparaus for coal gasification unit. 4,231,761, Cl. 48-192.000.
Meyerson, Stanley. Watch bracelet. 4,231,502, Cl. 224-177.000.
Mezzanotte, Mario, to Societa Pneumatici Pirelli S.p.A. Radial vehicle tire. 4,231,409, Cl. 152-354.00R.
Miale, Joseph N.: *See—*
Chen, Nai Y.; Miale, Joseph N.; and Reagan, William J., 4,231,899, Cl. 252-455.00Z.
Micciarelli, Mario: *See—*
Palladino, Gaetano; and Micciarelli, Mario, 4,232,013, Cl. 424-241.000.
Michael Huber Munchen, GmbH: *See—*
Clausen, Dieter; and Uhlemayr, Albert, 4,231,742, Cl. 8-470.000.
Michalik, Horst B.: *See—*
Weschenfelder, Otto T.; and Michalik, Horst B., 4,231,559, Cl. 493-426.000.
Michel, Thomas J.: *See—*
Finger, Richard H.; and Michel, Thomas J., 4,232,355, Cl. 361-235.000.
Michel, Wolfgang; and Kalberer, Heinz, to Hoechst Aktiengesellschaft. Porous shaped cellulose hydrate article with an improved cleaning effect. 4,232,128, Cl. 521-134.000.
Michurov, Jury I.: *See—*
Adigamov, Engel R.; Gurvich, Yakov A.; Liakumovich, Alexandr G.; Logutov, Igor J.; Michurov, Jury I.; Polenov, Alexei S.; and Yanshevsky, Vladimir A., 4,232,176, Cl. 568-756.000.
Microform Communications Limited: *See—*
Lithgow, Keith B., 4,231,538, Cl. 248-226.100.
Middel, Jan: *See—*
Vander, Timen; Thijssen, Nicolaas J.; de Blok, Jan F.; and Middel, Jan, 4,231,845, Cl. 202-113.000.
Middleton, Anthony E.; and McQuillin, Brian, to Davy-Loewy Ltd. Manipulator. 4,231,701, Cl. 414-730.000.
Midori Anzen Company, Ltd.: *See—*
Martin, Frank E., 4,231,359, Cl. 128-201.180.
Mikkelsen, Henrik; and Andersen, Bjarne B., to Inter-Ikea A/S. Unit joint for connecting two angularly arranged panel units. 4,231,203, Cl. 52-284.000.
Mikuni Kogyo Co., Ltd.: *See—*
Kubota, Kenichi; Mukai, Osamu; and Kariyama, Kenji, 4,231,716, Cl. 417-315.000.
Miles Laboratories, Inc.: *See—*
Hartzler, Harold E., 4,231,939, Cl. 260-343.600.
Schut, Robert N.; Snoke, Edgar O.; and Van Dyke, John W., Jr., 4,232,160, Cl. 546-146.000.
Vogelhut, Paul O., 4,231,754, Cl. 23-230.00R.
Millea, Michael F.; and Seib, David H., to United States of America, Air Force. Method and apparatus for trimming IR/CCD mosaic sensors. 4,232,221, Cl. 250-311.000.
Miller, Bernard D.: *See—*
Dobkin, Robert C.; Isbell, Tim D.; Miller, Bernard D.; and Sample, Lawrence R., 4,232,271, Cl. 330-258.000.
Miller, John D.: *See—*
Seibert, Chesterfield F.; and Miller, John D., 4,231,768, Cl. 55-179.000.
Miller, Richard J.; Chang, Kwen-Jen; and Cuatrecasas, Pedro, to Burroughs Wellcome Co. Assay method and compounds. 4,231,923, Cl. 260-112.50R.
Miller, Robert C., to Summa Corporation. High temperature skin construction. 4,232,093, Cl. 428-591.000.
Milliken Research Corporation: *See—*
Moot, Lorence M., 4,231,744, Cl. 8-495.000.
Milton, Harold W., Jr.: *See—*
Pringle, William L.; Hochstein, Peter A.; and Milton, Harold W., Jr., 4,231,223, Cl. 60-527.000.
Minami, Syuji; and Kashiwa, Norio, to Mitsui Petrochemical Industries Ltd. Process for producing polymers or copolymers of olefins containing at least 3 carbon atoms. 4,232,139, Cl. 526-125.000.
Mine Safety Appliances Company: *See—*
Wise, Layton A., 4,231,361, Cl. 128-202.260.
Minnesota Mining and Manufacturing Company: *See—*
Buerkley, Donald D.; Sweeny, Norman P.; and Vivona, Daniel N., 4,232,083, Cl. 428-307.000.
Carlson, Robert C., 4,231,886, Cl. 252-117.000.
Jamieson, Peter B., 4,232,116, Cl. 430-510.000.
Marchesano, Carlo, 4,232,113, Cl. 430-450.000.
Ramey, Joseph F.; Seiler, George A.; and Thompson, Dorman N., Jr., 4,231,837, Cl. 156-522.000.
Smith, George H.; and Olofson, Peter M., 4,231,951, Cl. 260-446.000.
Minolta Camera Kabushiki Kaisha: *See—*
Abe, Haruo, 4,231,636, Cl. 350-175.0FS.
Minor, William F. Combined box, table and bench. 4,231,453, Cl. 190-11.000.
Mintz, Leonard A. Method for applying magnetic strips. 4,231,828, Cl. 156-230.000.
Mishina, Haruo: *See—*
Ueda, Shinjiro; Takada, Yoshihiro; Mishina, Haruo; and Kuroda, Atsuhiko, 4,231,706, Cl. 416-186.00R.
Mita Industrial Company Ltd.: *See—*
Fukuda, Hideo; Morikawa, Hiroichi; Kamezawa, Yasutoki; and Aizawa, Tatsuo, 4,232,101, Cl. 430-56.000.
Mitsubishi Denki Kabushiki Kaisha: *See—*
Tanaka, Masaaki; Ueno, Takanori; and Tabata, Norikazu, 4,232,229, Cl. 250-541.000.
Mitsubishi Gas Chemical Company, Inc.: *See—*
Yoneoka, Mikio; Osugi, Minoru; and Ikarashi, Takeo, 4,232,171, Cl. 560-239.000.
Mitsubishi Kinzoku Kabushiki Kaisha: *See—*
Takeuchi, Yo; Ohbori, Koichi; Hatsushika, Masabumi; and Komori, Shinichi, 4,231,817, Cl. 148-32.500.
Mitsubishi Rayon Company, Limited: *See—*
Kamada, Isao, 4,232,078, Cl. 428-195.000.
Mitsui, Akio: *See—*
Adachi, Keiichi; Shishido, Tadao; and Mitsui, Akio, 4,232,114, Cl. 430-504.000.
Mitsui Petrochemical Industries Ltd.: *See—*
Minami, Syuji; and Kashiwa, Norio, 4,232,139, Cl. 526-125.000.
Mitsui Toatsu Chemicals, Incorporated: *See—*
Konoki, Keizo; Nobue, Michio; Fukui, Akito; and Inoue, Shigeru, 4,231,961, Cl. 564-65.000.
Oba, Masayuki; Kawamata, Motoo; Tsuboi, Hikotada; and Koga, Nobuhito, 4,231,934, Cl. 260-326.5FM.
Mitzel, Allen M.: *See—*
Johnson, Roger F.; and Mitzel, Allen M., 4,231,160, Cl. 33-174.00P.
Miyagawa, Tuyoshi; and Arikawa, Junichi, to Laurel Bank Machine Co., Ltd. Paper sheet holding device for paper sheet counter. 4,231,564, Cl. 271-95.000.
Miyakawa, Seiichi: *See—*
Kaneko, Tamaki; Miyakawa, Seiichi; Satomi, Toyokazu; Koizumi, Yutaka; Nakamura, Isao; and Tabata, Yasuhiro, 4,231,561, Cl. 271-3.100.
Miyamoto, Taketoshi: *See—*
Nakagawa, Eishiro; Miyamoto, Taketoshi; Umino, Naozi; and Oyama, Hirosi, 4,231,146, Cl. 29-432.000.
Miyazaki, Kenichi: *See—*
Motoyama, Koichiro; Takanashi, Itsuo; Miyoshi, Tadayoshi; Nakagaki, Shintaro; Yokokawa, Sumio; and Miyazaki, Kenichi, 4,232,331, Cl. 358-44.000.
Miyazako, Takushi; and Nagatomo, Shigeru, to Fuji Photo Film Co., Ltd. Photographic photosensitive element with protective layer and image forming method using same. 4,232,111, Cl. 430-355.000.
Miyoshi, Keisuke: *See—*
Ochi, Matsuo; and Miyoshi, Keisuke, 4,232,247, Cl. 313-474.000.
Miyoshi, Tadayoshi: *See—*
Motoyama, Koichiro; Takanashi, Itsuo; Miyoshi, Tadayoshi; Nakagaki, Shintaro; Yokokawa, Sumio; and Miyazaki, Kenichi, 4,232,331, Cl. 358-44.000.
Mizuno, Shuzo, to Kabushiki Kaisha Kogen. Supervisory control system and apparatus. 4,232,306, Cl. 340-506.000.
MKD Corporation: *See—*
Campanella, Matthew J.; Maladra, Anthony; and Goldberg, Bennett C., 4,231,511, Cl. 235-375.000.
Mo Och Domsjo Aktiebolag: *See—*
Hessner, Hans, 4,231,357, Cl. 128-156.000.
Mobil Oil Corporation: *See—*
Chang, Clarence D.; Lang, William H.; and LaPierre, Rene B., 4,231,955, Cl. 260-465.100.
Chen, Nai Y.; Miale, Joseph N.; and Reagan, William J., 4,231,899, Cl. 252-455.00Z.
Moore, Edward J.; and Sedlak, Michael, 4,231,752, Cl. 23-230.0HC.
Moczygemba, George A.: *See—*
Irvin, Howard B.; Lewis, Ronnie L.; and Moczygemba, George A., 4,232,137, Cl. 526-71.000.
Model, Ernst, to Ciba-Geigy Corporation. Tetraphenylketazines and isoindolinone pigments obtained therefrom. 4,231,931, Cl. 260-325.0PH.
Moegen, Gerhard: *See—*
Lingstaedt, Ernst; Moegen, Gerhard; and Wotruba, Gottfried, 4,232,261, Cl. 323-22.00R.
Moertel, George B., to Textron, Inc. Slide fastener. 4,231,138, Cl. 24-205.16R.
Molins, Ltd.: *See—*
Hinchcliffe, Dennis; Heybourn, Frank; and Luddington, Eric A., 4,231,461, Cl. 198-347.000.
Molson, William N.: *See—*
Caplan, Sidney W.; and Molson, William N., 4,231,197, Cl. 52-36.000.
Molvik, Arthur W.: *See—*
Fink, Joel H.; and Molvik, Arthur W., 4,232,244, Cl. 313-363.000.
Mona, Roberto; and Gnieser, Jurgen, to Sulzer Brothers Limited. Method for the preservation of an activated sludge. 4,231,862, Cl. 210-601.000.

Monaghan, Richard L.; Alberts, Alfred W.; Hoffman, Carl H.; and Albers-Schonberg, George, to Merck & Co., Inc. Hypocholesteremic fermentation products and process of preparation. 4,231,938, Cl. 260-343.500.

Monguzzi, Riccardo; Pifferi, Giorgio; Pinza, Mario; and Broccali, Giampietro, to CRAF Sud. Hydrazono penicillin derivatives. 4,231,927, Cl. 260-239.100.

Monsanto Chemicals Limited: *See*—
Baxter, Samuel; and Cuangani, Pushpkumar D., 4,232,130, Cl. 521-143.000.

Monsanto Company: *See*—
Bollinger, Frederic G., 4,231,783, Cl. 71-90.000.
Czajkowski, Albert J.; and Schafer, David E., 4,231,786, Cl. 71-100.000.
Franz, John E.; and Kaufman, Robert J., 4,231,782, Cl. 71-87.000.

Monsen, Geoffrey: *See*—
Falconer, John D.; Proudlock, George T.; and Monsen, Geoffrey, 4,231,484, Cl. 220-89.00A.

Monsheimer, Rolf: *See*—
Braeumer, Klaus; Eckmayer, Zdenek; Berg, Alexander; Monsheimer, Rolf; and Pfleiderer, Ernst, 4,232,123, Cl. 435-69.000.

Montedison S.p.A.: *See*—
Calmanti, Giulio; Gafa, Salvatore; Dadea, Giovanni M.; Gatti, Alfonso; and Burzio, Fulvio, 4,231,841, Cl. 162-5.000.

Moore, Edward J.; and Sedlak, Michael, to Mobil Oil Corporation. Method of determining salt water in oils. 4,231,752, Cl. 23-230.0HC.

Moore, George G. I., to Riker Laboratories, Inc. Anti-inflammatory method. 4,232,043, Cl. 424-340.000.

Moore, Thomas W., Jr.: *See*—
Graham, Paul W. L.; and Moore, Thomas W., Jr., 4,231,778, Cl. 65-117.000.

Moot, Lorence M., to Milliken Research Corporation. Process for dyeing closely constructed non-tufted textile materials and products produced thereby. 4,231,744, Cl. 8-495.000.

Moplefan S.p.A.: *See*—
Bordini, Fosco; and Mauri, Luigi, 4,232,089, Cl. 428-413.000.

Moranne, Jean-Pierre, to Societe Anonyme des Usines Chausson. Method for protecting heat exchanger tubes made of aluminum against erosion and/or corrosion. 4,231,422, Cl. 165-69.000.

Moranne, Jean-Pierre, to Societe Anonyme des Usines Chausson. Header constituting a pressurizing tank. 4,231,424, Cl. 165-107.00D.

Moranne, Jean-Pierre, to Societe Anonyme des Usines Chausson. Lead based alloy for the bonding of aluminum parts to parts comprising an alloy of a heavy metal. 4,231,794, Cl. 75-166.00C.

Mori, Fumio; Ichinose, Isao; and Kunimoto, Go, to Toyo Seikan Kaisha, Ltd. Polyolefin-metal bonded structures and process for preparing same. 4,232,086, Cl. 428-341.000.

Mori, Toshio: *See*—
Tobita, Hideyuki; and Mori, Toshio, 4,231,130, Cl. 8-159.000.

Mori, Yoshihisa; Mashimo, Norio; and Eguchi, Takeo, to Sony Corporation. Record player for a stationary record disc. 4,232,202, Cl. 179-100.40E.

Moriconi, Leonard E.; and Yoshida, Yoshitaka, to General Motors Corporation. Unitary electric motor and bi-directional controller arrangement. 4,232,256, Cl. 318-292.000.

Morikawa, Hiroichi: *See*—
Fukuda, Hideo; Morikawa, Hiroichi; Kamezawa, Yasutoki; and Aizawa, Tatsuo, 4,232,101, Cl. 430-56.000.

Morita, Douglas R.: *See*—
Dahn, C. James; Morita, Douglas R.; and Tulis, Allen J., 4,231,293, Cl. 102-7.200.

Morita, Tominori: *See*—
Tsukamoto, Goro; Yoshino, Koichiro; Morita, Tominori; Nose, Takashi; and Okazaki, Mitsuo, 4,232,010, Cl. 424-200.000.

Moritz, Frederick G.: *See*—
Mosciatti, Roger; Foley, Thomas P.; and Moritz, Frederick G., 4,232,353, Cl. 361-172.000.

Mortelmans, Joost, to International Business Machines Corporation. Distortion correction in electromagnetic deflection yokes. 4,232,253, Cl. 315-370.000.

Mosciatti, Roger; Foley, Thomas P.; and Moritz, Frederick G. Door lock security system. 4,232,353, Cl. 361-172.000.

Moser, Kenneth W.; Siemens, Richard E.; and Rhoads, Stanley C., to United States of America, Interior. Recovery of organic and aqueous phases from solvent extraction emulsions. 4,231,866, Cl. 210-660.000.

Moser, Kurt; and Wegmann, Helmut, to Develop KG Dr. Eisbein & Co. Drum for electrophotographic copier. 4,231,652, Cl. 355-3.0DR.

Moser, Paul, to Ciba-Geigy Corporation. Novel light stabilizers. 4,231,921, Cl. 260-45.75R.

Moss, Mark D., to Hedstrom Co. Foldable round bouncer/walker. 4,231,582, Cl. 280-87.02W.

Moss, Winston C.: *See*—
Inouye, George T.; Sanders, Nathaniel L.; and Moss, Winston C., 4,232,070, Cl. 428-49.000.

Mostmans, Joseph H.: *See*—
Heeres, Jan; Backx, Leo J. J.; and Mostmans, Joseph H., 4,232,034, Cl. 424-269.000.

Motoren- und Turbinen-Union Muenchen GmbH: *See*—
Weiler, Wolfgang, 4,231,703, Cl. 415-159.000.

Motorola, Inc.: *See*—
Dworsky, Lawrence N.; Whalin, Jeffery A.; and Glotzbach, Warren P., 4,232,239, Cl. 310-312.000.
Gould, Larrie A.; and Reed, Kim W., 4,232,398, Cl. 455-226.000.
Keeling, Michael C.; and Doss, Dwight E., 4,231,807, Cl. 136-251.000.
Kern, Neil C., 4,232,315, Cl. 343-7.300.
Knappenberger, Thomas A.; and Landers, James F., Jr., 4,231,916, Cl. 260-37.0EP.
Wrathall, Robert S., 4,231,332, Cl. 123-416.000.

Motoyama, Koichiro; Takanashi, Itsuo; Miyoshi, Tadayoshi; Nakagaki, Shintaro; Yokokawa, Sumio; and Miyazaki, Kenichi, to Victor Company of Japan, Ltd. Circuit for stabilizing the black level in an output signal of a camera tube in a color television camera. 4,232,331, Cl. 358-44.000.

Mount Isa Mines Limited: *See*—
Cherkson, Leonard A., 4,231,252, Cl. 73-151.000.

Mroz, Judith C.; and Thomas, Dennis A., to Procter & Gamble Company, The. Disposable diaper type garment having wetness indicator. 4,231,370, Cl. 128-287.000.

Muanyagipari Kutato Intezet: *See*—
Kovacsay, Istvan; Szajko nee Lorinczi, Maria; Dubovszky, Istvan; Magdanyi, Laszlo; Szailer, Ferenc; and Szatmari, Ede, 4,232,136, Cl. 525-327.000.

Muchowski, Joseph M.: *See*—
Kluge, Arthur F.; and Muchowski, Joseph M., 4,232,038, Cl. 424-274.000.

Mueller, Rand W.; and Stec, Daniel L. Electrically actuated lock for a door or similar access means. 4,232,354, Cl. 361-172.000.

Mukai, Osamu: *See*—
Kubota, Kenichi; Mukai, Osamu; and Kariyama, Kenji, 4,231,716, Cl. 417-315.000.

Muller-Calgan, Helmut: *See*—
Poetsch, Eike; Uhl, Jurgen; Marx, Dieter; Strehlow, Wighard; Muller-Calgan, Helmut; and Dolce, Giuliano, 4,232,016, Cl. 414-244.000.

Muller, Dieter, to Buehler-Miag GmbH. Apparatus for crystallizing an amorphous particulate material. 4,231,991, Cl. 422-245.000.

Munch, Erik: *See*—
Holbek, Gert A. E., 4,231,297, Cl. 108-10.000.

Murakami, Kaoru; Okahisa, Mitsugu; Arita, Tomohiko; and Kumano, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Divalent silver oxide for use in primary cell and manufacturing method thereof. 4,231,889, Cl. 252-182.100.

Murakami, Yoichi: *See*—
Menju, Shinichi; Takahashi, Kunio; Haginomori, Eiichi; Murakami, Yoichi; and Zaima, Eiichi, 4,231,258, Cl. 73-572.000.

Muramatsu, Shigeru, to Nippon Gakki Seizo Kabushiki Kaisha. Remote control unit. 4,231,310, Cl. 114-144.0RE.

Murata, Tetsuo: *See*—
Matsuda, Teruo; and Murata, Tetsuo, 4,231,967, Cl. 568-433.000.

Murata, Toshinori; and Matsuura, Shigeo, to Hitachi, Ltd. Automatic channel selection apparatus. 4,232,397, Cl. 455-179.000.

Murphy, William P., Jr.: *See*—
Lipps, Bennie J.; Murphy, William P., Jr.; and Mather, Frank W., III, 4,231,871, Cl. 210-87.000.

Murray, Joseph E., Jr.: *See*—
Davis, Carl W.; and Murray, Joseph E., Jr., 4,231,645, Cl. 354-145.000.

Musashi Seimitsu Kogyo Kabushiki Kaisha: *See*—
Satoh, Eiji; Kohama, Masayuki; Yokoya, Kunihiko; Yamada, Kenji; and Nemoto, Akira, 4,231,673, Cl. 403-125.000.

Musselmann, Walter: *See*—
Ortner, Herbert; Bahr, Theodor; and Musselmann, Walter, 4,231,526, Cl. 241-28.000.

Mustin, Michel: *See*—
Marty, Didier; Abadie, Albert; and Mustin, Michel, 4,231,864, Cl. 210-669.000.

My-D-Han-D Manufacturing Co.: *See*—
Tieben, James, 4,231,190, Cl. 49-25.000.

Myers, Lawrence F.: *See*—
Cooper, Izates C., 4,231,156, Cl. 33-1.0LE.

Myron, Donald L.; and Berringer, Robert T., to Westinghouse Electric Corp. Guide tube flow diffuser. 4,231,843, Cl. 176-50.000.

Nagahara, Yasumori; and Iida, Haruki, to Ricoh Company, Ltd. Oil supply apparatus. 4,231,653, Cl. 355-3.0FU.

Nagaishi, Hastuo: *See*—
Suzuki, Suzuo; Nagaishi, Hastuo; and Masaki, Kenji, 4,231,331, Cl. 123-416.000.

Nagashima, Akira: *See*—
Iwasaki, Masayuki; Sato, Shigeru; Inoue, Yasuo; and Nagashima, Akira, 4,232,106, Cl. 430-170.000.

Nagata, Wataru; Hamashima, Yoshio; Tsuji, Teruji; and Lunn, William H. W., to Shionogi & Co., Ltd. Dihydrotriazinylthiooxacephalosporins. 4,232,151, Cl. 544-90.000.

Nagatomo, Shigeru: *See*—
Miyazako, Takushi; and Nagatomo, Shigeru, 4,232,111, Cl. 430-355.000.

Nagode, Gerald E. Package wrapping machine. 4,231,210, Cl. 53-397.000.

Nair, Vijay G.; Joseph, Joseph P.; and Bernstein, Seymour, to American Cyanamid Company. Oligosaccharide precursors to substituted O-α-D and O-β-D-multigalactopyranosyl and glucopyranosyl 1→4 and 1→6 galactopyranosyl 1→6α-D-glucopyranoses. 4,232,150, Cl. 536-119.000.

Naito, Takayuki; Okumura, Jun; and Kamachi, Hajime, to Bristol-Myers Company. Antibacterial agents. 4,231,928, Cl. 260-239.100.

Naito, Takayuki; Nakagawa, Susumu; Yamasaki, Tetsuro; Okita, Taka-Aki; and Yamashita, Haruhiro, to Bristol-Myers Company. Purine compounds. 4,232,155, Cl. 544-277.000.

Nakagaki, Shintaro: *See*—
Motoyama, Koichiro; Takanashi, Itsuo; Miyoshi, Tadayoshi; Nakagaki, Shintaro; Yokokawa, Sumio; and Miyazaki, Kenichi, 4,232,331, Cl. 358-44.000.
Nakagawa, Eishiro; Miyamoto, Taketoshi; Umino, Naozi; and Oyama, Hirosi, to Pentel Kabushiki Kaisha. Method of making a tip for a ball point pen. 4,231,146, Cl. 29-432.000.
Nakagawa, Hiroshi; Kawa, Hidetoshi; and Kawai, Makoto, to Matsushita Electric Industrial Co., Ltd. Numerical control tape preparation machine. 4,232,335, Cl. 358-101.000.
Nakagawa, Susumu: *See*—
Naito, Takayuki; Nakagawa, Susumu; Yamasaki, Tetsuro; Okita, Taka-Aki; and Yamashita, Haruhiro, 4,232,155, Cl. 544-277.000.
Nakagawa, Tadashi: *See*—
Kitai, Kiyoshi; Nakagawa, Tadashi; and Ishida, Hiroaki, 4,231,648, Cl. 354-195.000.
Nakagawa, Takehiko: *See*—
Hattori, Seizi; Makino, Koichi; Nakagawa, Takehiko; and Shinohara, Masayoshi, 4,232,061, Cl. 427-130.000.
Nakagawa, Yoshimasa. Head and face protecting hood. 4,231,118, Cl. 2-7.000.
Nakagawa, Yunosuke: *See*—
Yagi, Kouichi; and Nakagawa, Yunosuke, 4,231,890, Cl. 252-186.000.
Nakajima, Yosuke: *See*—
Tabei, Masatoshi; Kawaziri, Kazuhiro; and Nakajima, Yosuke, 4,231,808, Cl. 136-260.000.
Nakamura, Isao: *See*—
Kaneko, Tamaki; Miyakawa, Seiichi; Satomi, Toyokazu; Koizumi, Yutaka; Nakamura, Isao; and Tabata, Yasuhiro, 4,231,561, Cl. 271-3.100.
Nakane, Mototaka; and Hori, Hideichi, to Aisin Seiki Kabushiki Kaisha. Clutch releasing device. 4,231,456, Cl. 192-70.250.
Nakano, Kinichi; Urakawa, Chikahiro; and Imai, Ryoji, to Kyowa Hakko Kogyo Kabushiki Kaisha. Mitomycin C derivatives. 4,231,936, Cl. 260-326.240.
Nakata, Kunio: *See*—
Okino, Seiki; Nakata, Kunio; Yanai, Tosiharu; and Kandachi, Takayoshi, 4,232,062, Cl. 427-160.000.
Nakayama, Masafumi, to Nissan Motor Company, Limited. Supply apparatus. 4,231,972, Cl. 261-44.00D.
Naoi, Keigo: *See*—
Saito, Akihiro; and Naoi, Keigo, 4,232,238, Cl. 310-68.00D.
Naoi, Takashi; and Horie, Ikutard, to Fuji Photo Film Co., Ltd. Photographic light-sensitive materials having improved film physical properties. 4,232,117, Cl. 430-539.000.
Nappen, Bernard H., to National Starch and Chemical Corporation. Process for powdering high fat foodstuffs. 4,232,052, Cl. 426-601.000.
Narayan, Thirumurti L.: *See*—
Cenker, Moses; and Narayan, Thirumurti L., 4,232,127, Cl. 521-106.000.
Narbaits-Jaureguy, Jean-Raymond; Billottet, Henri; and Granier, Pierre, to Thomson-CSF. Electromagnetic detector responsive to a modification of a magnetic field. 4,232,285, Cl. 340-38.00L.
Nash, Gilbert J.; and Seidel, Gerhard E., to Boeing Commercial Airplane Company. Convertible container for fluent or solid cargo. 4,231,481, Cl. 220-1.500.
Nasu, Rikuo: *See*—
Nishiyama, Ryuzo; Takahashi, Ryohei; Fujikawa, Kanichi; Nasu, Rikuo; and Sakashita, Nobuyuki, 4,231,787, Cl. 71-107.000.
Natale, Anthony J., Jr., to Towmotor Corporation. Latch assembly. 4,231,598, Cl. 292-210.000.
National Custom Van Corp.: *See*—
Bernacchia, George, Jr., 4,231,144, Cl. 29-401.100.
National Drying Machinery Company: *See*—
Parkes, Ralph C., 4,231,470, Cl. 198-797.000.
National Research Development Corporation: *See*—
Day, William H., 4,231,120, Cl. 3-1.910.
Whitehead, Alan G.; and Tite, David J., 4,231,306, Cl. 111-86.000.
National Semiconductor Corporation: *See*—
Dobkin, Robert C.; Isbell, Tim D.; Miller, Bernard D.; and Sample, Lawrence R., 4,232,271, Cl. 330-258.000.
National Starch and Chemical Corporation: *See*—
Nappen, Bernard H., 4,232,052, Cl. 426-601.000.
NCR Corporation: *See*—
Paugstat, John F.; and Girard, Donald J., 4,232,375, Cl. 364-900.000.
Nedelec, Lucien: *See*—
Dumont, Claude; Guillaume, Jacques; and Nedelec, Lucien, 4,232,031, Cl. 424-263.000.
Nedstedt, Gert: *See*—
Palm, Lars-Erik; Nedstedt, Gert; and Nilen, Bengt, 4,232,048, Cl. 426-115.000.
Needham, Riley B.; Thomas, Charles P.; and Wier, Donald R., to Phillips Petroleum Company. Well treatment method. 4,231,428, Cl. 166-280.000.
Neefe, Charles W., to Neefe Optical Laboratory. Polymethylmethacrylate cellulosic copolymer lens material. 4,231,905, Cl. 260-17.00A.
Neefe Optical Laboratory: *See*—
Neefe, Charles W., 4,231,905, Cl. 260-17.00A.
Neidig, Arno; Popp, Gerhard; and Gilbers, Gabriele, to BBC Brown, Boveri & Company, Limited. Chemically sensitive field effect transistor having electrode connections. 4,232,326, Cl. 357-23.000.
Neier, Wilhelm: *See*—
Brandes, Gunter; Wollner, Johannes; Neier, Wilhelm; and Webers, Werner, 4,231,966, Cl. 568-396.000.
Neilsen, Hildaur L., to Rolodex Corporation, The. Locking rotary file. 4,231,624, Cl. 312-186.000.
Neilson, Jay C., to Kockum Industries, Inc. Conveyor with laterally adjustable flights. 4,231,464, Cl. 198-456.000.
Nelimarkka, Juha A. E. High pressure ball valve with tipping action. 4,231,545, Cl. 251-161.000.
Nemirovsky, Isaak Y.: *See*—
Unigovsky, Mikhail R.; Rulevsky, Evgeny V.; Sapa, Fedor I.; Parkhomchuk, Alexei T.; Yampolsky, Arnold S.; Rotenfeld, Veniamin S.; Ivanov, Vasily T.; Nemirovsky, Isaak Y.; Kovalenko, Viktor M.; and Vnuchenko, Nikolai S., 4,231,694, Cl. 409-179.000.
Nemoto, Akira: *See*—
Satoh, Eiji; Kohama, Masayuki; Yokoya, Kunihiko; Yamada, Kenji; and Nemoto, Akira, 4,231,673, Cl. 403-125.000.
Netravali, Arun N.; and Robbins, John D., to Bell Telephone Laboratories, Incorporated. Method and apparatus for video signal encoding with motion compensation. 4,232,338, Cl. 358-136.000.
Neuhaus-Schwermann, Albert: *See*—
Linneborn, Hans, 4,231,302, Cl. 110-229.000.
New Concepts, Inc.: *See*—
Still, Robert C.; Huppenthal, Frank J.; Smith, Barbara J.; and Scotney, Gerald H., 4,231,389, Cl. 137-315.000.
Newman, Fred C., to Continental Group, Inc., The. Carrier assembly for multi-pack containers. 4,231,605, Cl. 294-87.200.
Newport, Harry E., Jr.; and Baysinger, Robert L., to Emerson Electric Co. Gas burner control system. 4,231,732, Cl. 431-46.000.
Newton, David W., to Valleylab, Inc. Safety monitoring circuit for electrosurgical unit. 4,231,372, Cl. 128-303.140.
NGK Insulators, Ltd.: *See*—
Higuchi, Noboru; Ogasawara, Takayuki; and Seike, Shoji, 4,232,185, Cl. 174-140.00C.
Niagara Bottle Washer Manufacturing Co.: *See*—
Vamvakas, Michael, 4,231,463, Cl. 198-446.000.
Nichols, Webb. Light frame for drafting table. 4,232,358, Cl. 362-97.000.
Nickell, Louis G.: *See*—
Siemer, Sidney R.; Gordon, Richard S.; and Nickell, Louis G., 4,231,788, Cl. 71-113.000.
Nicklas, Walter; Hesler, Dietrich; and Gresser, Gerhard, to Karl M. Reich Maschinenfabrik GmbH, Firma. Method for melting and applying a fusion adhesive. 4,232,064, Cl. 427-208.400.
Nicol, Edward A.: *See*—
Juziuk, Jurgen A.; Mack, Ronald H.; Banka, Eugene F.; and Nicol, Edward A., 4,232,217, Cl. 235-480.000.
Nikolov, Ivan D.; Chorbov, Iliya G.; and Peychev, Ivan M., to NPO "Technologia Na Metalite". Apparatus for casting metals and other materials under pressure. 4,231,416, Cl. 164-318.000.
Nilen, Bengt: *See*—
Palm, Lars-Erik; Nedstedt, Gert; and Nilen, Bengt, 4,232,048, Cl. 426-115.000.
Nippel, Frank, to Deutsche Nemectron GmbH. Instrument panel teaching aid. 4,231,168, Cl. 35-39.000.
Nippon Electric Co., Ltd.: *See*—
Nomoto, Koh, 4,232,301, Cl. 340-789.000.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Ando, Shigeo; and Kondou, Takayasu, 4,231,276, Cl. 84-1.190.
Fujishima, Masakazu, 4,232,394, Cl. 455-158.000.
Kumaoka, Michiaki; and Aosima, Sinzi, 4,232,393, Cl. 455-154.000.
Muramatsu, Shigeru, 4,231,310, Cl. 114-144.0RE.
Wachi, Masatada, 4,231,277, Cl. 84-1.190.
Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See*—
Marui, Toshio; and Masuda, Masuo, 4,231,829, Cl. 156-230.000.
Nippon Keori Kabushiki Kaisha: *See*—
Noritake, Hiroshi, 4,232,082, Cl. 428-225.000.
Nippon Kogaku K.K.: *See*—
Iida, Yozo, 4,231,646, Cl. 354-195.000.
Kimura, Makoto; and Iizuka, Yutaka, 4,231,649, Cl. 354-224.000.
Tsuruoka, Tomio, 4,231,651, Cl. 354-288.000.
Nippon Mining Co., Ltd.: *See*—
Kawasumi, Yoshio; and Sato, Haruki, 4,231,848, Cl. 204-20.000.
Nippon Oil Co., Ltd.: *See*—
Kato, Osamu; Uemura, Seiichi; Yamamoto, Syunichi; Hirose, Takao; and Takashima, Hiroaki, 4,231,857, Cl. 208-40.000.
Nippon Soken, Inc.: *See*—
Sakakibara, Yasuyuki, 4,232,303, Cl. 340-366.00R.
Yoshino, Yasuhisa; Kuno, Akira; and Shinoda, Yoshio, 4,231,257, Cl. 73-432.0CR.
Nippon Telegraph and Telephone Public Corporation: *See*—
Terada, Akira; Hattori, Seizi; Ishii, Yoshikazu; Nohara, Akira; Inagaki, Nobuo; Matsuda, Wakatake; and Kawakami, Susumu, 4,232,071, Cl. 428-64.000.
Yamamoto, Hideaki; Tsukada, Toshihisa; Maruyama, Eiichi; and Inagaki, Hiroya, 4,232,219, Cl. 250-227.000.
Nishikawa, Kazuyoshi; Uno, Makoto; and Koga, Hideaki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Lubricating device for power transmission unit. 4,231,266, Cl. 74-467.000.
Nishimiya, Torazo; Okumura, Masamitsu; Ito, Tomo; and Numakura, Seisaku, to Hitachi, Ltd. Exhaust gas recirculation control system for internal combustion engine. 4,231,340, Cl. 123-568.000.
Nishioka, Yoshiki: *See*—
Yasuda, Syoichi; and Nishioka, Yoshiki, 4,232,290, Cl. 340-146.30Z.
Nishiyama, Ryuzo; Takahashi, Ryohei; Fujikawa, Kanichi; Nasu, Rikuo; and Sakashita, Nobuyuki, to Ishihara Sangyo Kaisha Ltd.

Herbicidal compound, herbicidal composition containing the same, and method of use thereof. 4,231,787, Cl. 71-107.000.

Nissan Motor Company, Limited: *See—*
Kato, Hironobu, 4,231,850, Cl. 204-181.00C.
Kato, Tadanari; Ikemi, Tadashi; and Sagawa, Takatoshi, 4,231,900, Cl. 252-466.0PT.
Nakayama, Masafumi, 4,231,972, Cl. 261-44.00D.
Sugasawa, Fukashi; and Iizuka, Haruhiko, 4,231,338, Cl. 123-568.000.
Suzuki, Suzuo; Nagaishi, Hastuo; and Masaki, Kenji, 4,231,331, Cl. 123-416.000.

Nissan Shatai Kabushiki Kaisha: *See—*
Fujita, Masao; and Kitaori, Kiyoshi, 4,231,240, Cl. 70-173.000.

Nitto Kogyo K.K.: *See—*
Kubota, Shigeru; Kano, Seiji; and Kubo, Masahiro, 4,231,152, Cl. 29-621.000.

NL Industries, Inc.: *See—*
Brauer, Melvin; and Kroplinski, Thaddeus F., 4,231,986, Cl. 264-272.000.

Nobue, Michio: *See—*
Konoki, Keizo; Nobue, Michio; Fukui, Akito; and Inoue, Shigeru, 4,231,961, Cl. 564-65.000.

Nogrady, Stephen G., to Welsh National School of Medicine, The. Procedures and pharmaceutical products for use in the administration of antihistamines. 4,232,002, Cl. 424-45.000.

Nohara, Akira: *See—*
Terada, Akira; Hattori, Seizi; Ishii, Yoshikazu; Nohara, Akira; Inagaki, Nobuo; Matsuda, Wakatake; and Kawakami, Susumu, 4,232,071, Cl. 428-64.000.

Noll, Robert W.: *See—*
Vance, Robert L.; and Noll, Robert W., 4,231,513, Cl. 236-49.000.

Nomoto, Koh, to Nippon Electric Co., Ltd. Apparatus for automatically selectively displaying information of a plurality of kinds. 4,232,301, Cl. 340-789.000.

Nonomura, Keisaku: *See—*
Funada, Fumiaki; Nonomura, Keisaku; Uede, Hisashi; and Wada, Tomio, 4,231,640, Cl. 350-336.000.

Nordiska Ackumulatorfabriker Noack AB: *See—*
Magnusson, Ulf S. G.; and Uhrbom, Lars E., 4,232,100, Cl. 429-217.000.

Noritake, Hiroshi, to Nippon Keori Kabushiki Kaisha. Anti-electrostatically guarded worsted suiting. 4,232,082, Cl. 428-225.000.

Norman, Lewis R.: *See—*
Elphingstone, Eugene A.; and Norman, Lewis R., 4,231,882, Cl. 252-8.55C.

Norris Industries, Inc.: *See—*
Beisch, Hans R.; and Hempelmann, Heinrich J., 4,231,619, Cl. 301-37.00P.

North Shore Precision Research Corporation: *See—*
Davidson, William W., Jr., 4,231,291, Cl. 101-137.000.

Northern Telecom Limited: *See—*
Baraff, David R.; and Hobbs, Lawrence H., 4,232,212, Cl. 219-216.000.
Harris, Harold H., 4,232,293, Cl. 340-147.00R.
Lenaerts, George V., 4,232,203, Cl. 179-103.000.

Northrop Corporation: *See—*
Rennick, Lyle V.; and Macias, Julian W., 4,232,381, Cl. 367-135.000.

Norton Company: *See—*
Kiovsky, Joseph R.; and Goyette, William J., 4,232,181, Cl. 585-739.000.

Norwood Marking & Equipment Co.: *See—*
Shenoha, James L., 4,231,290, Cl. 101-93.110.

Nose, Takashi: *See—*
Tsukamoto, Goro; Yoshino, Koichiro; Morita, Tominori; Nose, Takashi; and Okazaki, Mitsuo, 4,232,010, Cl. 424-200.000.

Nowak, Eugene F. Folding garage screen door. 4,231,412, Cl. 160-213.000.

NPO "Technologia Na Metalite": *See—*
Nikolov, Ivan D.; Chorbov, Iliya G.; and Peychev, Ivan M., 4,231,416, Cl. 164-318.000.

NSK-Warner K.K.: *See—*
Magane, Shigeo; and Yamamoto, Kazuo, 4,231,590, Cl. 280-803.000.

Numakura, Seisaku: *See—*
Nishimiya, Torazo; Okumura, Masamitsu; Ito, Tomo; and Numakura, Seisaku, 4,231,340, Cl. 123-568.000.

N.V. Optische Industrie "De Oude Delft": *See—*
Deltrap, Johan H. M., 4,232,222, Cl. 250-333.000.

Oatey Co.: *See—*
Rios, Paul W., 4,231,492, Cl. 222-1.000.

Oba, Masayuki; Kawamata, Motoo; Tsuboi, Hikotada; and Koga, Nobuhito, to Mitsui Toatsu Chemicals, Incorporated. Process for the production of N-(hydroxyphenyl) maleimides. 4,231,934, Cl. 260-326.5FM.

Obergfell, James J. Shovel having fulcrum device. 4,231,604, Cl. 294-59.000.

Obrecht, Robert P., to Stauffer Chemical Company. Phosgene manufacture. 4,231,959, Cl. 260-544.00K.

Occidental Research Corporation: *See—*
Di Giacomo, Peter M.; and Dines, Martin B., 4,232,146, Cl. 528-395.000.

Ocean Technology, Inc.: *See—*
Adams, Robert H., 4,232,194, Cl. 179-1.50R.

Ochi, Matsuo; and Miyoshi, Keisuke, to Matsushita Electric Industrial Co., Ltd. Projection tube with X-ray shielding means on target. 4,232,247, Cl. 313-474.000.

O'Connell, Robert M., to United States of America, Air Force. High piezoelectric coupling X-cuts of lead potassium niobate, Pb_2KnbsO_{15}, for surface acoustic wave applications. 4,232,240, Cl. 310-313.00A.

Oda, Fujio: *See—*
Taguchi, Nobuyoshi; Matsuo, Koji; Takahashi, Hiromu; and Oda, Fujio, 4,232,213, Cl. 219-216.000.

O'Dell, C. Allen: *See—*
Shealy, Y. Fulmer; and O'Dell, C. Allen, 4,232,154, Cl. 544-250.000.

Odenthal, Charles: *See—*
Young, Joe W.; and Odenthal, Charles, 4,231,973, Cl. 261-78.00A.

Oestreich, Ulrich: *See—*
Zeidler, Guenter; and Oestreich, Ulrich, 4,231,635, Cl. 350-96.230.

Oettel, Michael: *See—*
Ponsold, Kurt; Prousa, Richard; Oettel, Michael; Strecke, Joachim; and Hoffmann, Herbert, 4,231,946, Cl. 260-397.400.

Officina Meccanica Pisani Luigi: *See—*
Pisani, Luigi, 4,231,142, Cl. 29-2.160.

Ogasawara, Takayuki: *See—*
Higuchi, Noboru; Ogasawara, Takayuki; and Seike, Shoji, 4,232,185, Cl. 174-140.00C.

Ogawa, Shinji: *See—*
Hatsuno, Hiroshi; Fukazawa, Jinpei; Fukushima, Mitsuo; and Ogawa, Shinji, 4,231,251, Cl. 73-119.00A.

Ogren, Sven O.: *See—*
Florvall, Gosta L.; and Ogren, Sven O., 4,232,037, Cl. 424-274.000.

Ohashi, Tadahiro: *See—*
Fukushima, Shigeki; and Ohashi, Tadahiro, 4,232,369, Cl. 364-476.000.

Ohbori, Koichi: *See—*
Takeuchi, Yo; Ohbori, Koichi; Hatsushika, Masabumi; and Komori, Shinichi, 4,231,817, Cl. 148-32.500.

Ohhinata, Ichiro: *See—*
Okuhara, Shinzi; Ohhinata, Ichiro; and Tokunaga, Michio, 4,232,234, Cl. 307-252.00G.

Ohio Nuclear, Inc.: *See—*
Jagatich, Carl T., 4,232,302, Cl. 340-347.0AD.

Ohkoshi, Akio: *See—*
Toyama, Akira; Ohkoshi, Akio; Toyama, Takashi; Yukawa, Takahiro; and Hosono, Takashi, 4,232,332, Cl. 358-67.000.

Ohlenforst, Hans: *See—*
Orain, Roger; Heuser, Hans; Ohlenforst, Hans; and Pelzer, Rudolf, 4,232,080, Cl. 428-215.000.

Ohm, Edward A., to Bell Telephone Laboratories, Incorporated. Multiple beam satellite antenna with preferred polarization distribution. 4,232,321, Cl. 343-778.000.

Ohnhaus, Buff; and Faith, James D. Air-flow capture and control device for flow measurement. 4,231,253, Cl. 73-861.620.

Ohnishi, Toshikazu; Ishida, Kozo; and Saitoh, Osamu, to Horiba, Ltd. Gas analyzer. 4,232,223, Cl. 250-343.000.

Ohshima, Iwao: *See—*
Menju, Shinichi; Ohshima, Iwao; and Takahashi, Shigeru, 4,232,352, Cl. 361-120.000.

Ohta, Teruo, to Sony Corporation. Tape cassette. 4,232,350, Cl. 360-132.000.

Ohuchida, Shuichi: *See—*
Hayashi, Masaki; Arai, Yoshinobu; Ohuchida, Shuichi; and Hashimoto, Shinsuke, 4,232,009, Cl. 424-180.000.

Ohumi, Takeharu; and Tsunekawa, Masaru, to Aisin Seiki Kabushiki Kaisha. Fuel pressure regulating valve. 4,231,347, Cl. 123-512.000.

Oida, Yoshio; Sasaki, Masayuki; and Semi, Hidetoshi, to Tokyo Shibaura Electric Co., Ltd. Output power control system for microwave ovens. 4,232,210, Cl. 219-10.55C.

Oiles Industries Co., Ltd.: *See—*
Satoh, Eiji; Kohama, Masayuki; Yokoya, Kunihiko; Yamada, Kenji; and Nemoto, Akira, 4,231,673, Cl. 403-125.000.

Ojala, Pertti, to Valmet Oy. Recovery of thermal energy from a thermomechanical pulp plant. 4,231,842, Cl. 162-47.000.

Oji Paper Co., Ltd.: *See—*
Shinohara, Hideaki; Kato, Masaru; and Takamatsu, Yoshiaki, 4,232,105, Cl. 430-160.000.

Okahisa, Mitsugu: *See—*
Murakami, Kaoru; Okahisa, Mitsugu; Arita, Tomohiko; and Kumano, Hiroshi, 4,231,889, Cl. 252-182.100.

Okamoto, Miyoshi, to Toray Industries, Inc. Fibrous sheet materials resembling a deer skin and process for preparing same. 4,232,073, Cl. 428-91.000.

Okano, Yoshihiro: *See—*
Kaieda, Nobuo; and Okano, Yoshihiro, 4,232,259, Cl. 318-615.000.

Okauchi, Ken; Koitabashi, Takeo; and Fujimori, Noboru, to Konishiroku Photo Industry Co., Ltd. Light-sensitive silver halide photographic material. 4,232,118, Cl. 430-574.000.

Okazaki, Gosei, to Shibuya Kogyo Kabushikigaisha. Box packing machine. 4,231,213, Cl. 53-497.000.

Okazaki, Mitsuo: *See—*
Tsukamoto, Goro; Yoshino, Koichiro; Morita, Tominori; Nose, Takashi; and Okazaki, Mitsuo, 4,232,010, Cl. 424-200.000.

Okii, Mitsuyoshi; Onitake, Tatsuya; Kawai, Masanobu; Takematsu, Tetsuo; and Konnai, Makato. Method for protecting crops from suffering damages. 4,231,789, Cl. 71-121.000.

Okino, Seiki; Nakata, Kunio; Yanai, Tosiharu; and Kandachi, Takayoshi, to Central Glass Company, Limited. Method of coating glass

surface with heat-reflective titanium oxide film. 4,232,062, Cl. 427-160.000.

Okita, Taka-Aki: *See*—
Naito, Takayuki; Nakagawa, Susumu; Yamasaki, Tetsuro; Okita, Taka-Aki; and Yamashita, Haruhiro, 4,232,155, Cl. 544-277.000.

Okuhara, Shinzi; Ohhinata, Ichiro; and Tokunaga, Michio, to Hitachi, Ltd. Semiconductor switch circuit. 4,232,234, Cl. 307-252.00G.

Okumura, Jun: *See*—
Naito, Takayuki; Okumura, Jun; and Kamachi, Hajime, 4,231,928, Cl. 260-239.100.

Okumura, Masamitsu: *See*—
Nishimiya, Torazo; Okumura, Masamitsu; Ito, Tomo; and Numakura, Seisaku, 4,231,340, Cl. 123-568.000.

Okuyama, Hidetoshi: *See*—
Touyama, Ryousuke; Inouye, Hiroyuki; Shingu, Tetsuro; Takeda, Yoshio; Ikumoto, Takeshi; Okuyama, Hidetoshi; and Yamamoto, Osamu, 4,232,159, Cl. 546-112.000.

Olander, Karl E., to Alfa-Laval AB. Milking machine claw. 4,231,323, Cl. 119-14.080.

Oldengott, Hans: *See*—
Mathiak, Hans; and Oldengott, Hans, 4,231,846, Cl. 202-248.000.

Olin Corporation: *See*—
Cline, Warren K.; and Martin, Richard H., 4,231,377, Cl. 131-9.000.

Olofson, Peter M.: *See*—
Smith, George H.; and Olofson, Peter M., 4,231,951, Cl. 260-446.000.

Olson, Richard O.: *See*—
Pohto, Gerald R.; and Olson, Richard O., 4,231,143, Cl. 29-281.500.

Olympia Werke AG: *See*—
Behrendt, Wolfgang; Bohnhage, Detlef; Friedemann, Peter; Frolich, Bernhard; and Orzessek, Reinhold, 4,231,667, Cl. 400-208.000.

Olympus Optical Co., Ltd.: *See*—
Kobayashi, Minoru, 4,232,349, Cl. 360-105.000.
Osanai, Akira, 4,231,268, Cl. 74-572.000.
Satoh, Ken; and Yanagida, Tuneo, 4,232,348, Cl. 360-74.100.
Sogi, Shinroku; Yoshinaga, Makoto; Shinohara, Toshio; Aihara, Takayuki; and Tawara, Ikuo, 4,231,403, Cl. 141-284.000.
Tsunefuji, Katsuhiko; and Kondo, Isao, 4,231,644, Cl. 354-51.000.

OMV Aktiengesellschaft: *See*—
Schmidt, Alfred, 4,231,960, Cl. 564-73.000.

Onishi, Nobuo. Cutter for thin boards. 4,231,275, Cl. 83-862.000.

Onishi, Sigeru, to Toyota Jidosha Kogyo Kabushiki Kaisha, a part interest. Engine drive type generator blower. 4,231,717, Cl. 417-364.000.

Onishi, Toshinari: *See*—
Kuramoto, Akio; and Onishi, Toshinari, 4,231,341, Cl. 123-552.000.

Onitake, Tatsuya: *See*—
Okii, Mitsuyoshi; Onitake, Tatsuya; Kawai, Masanobu; Takematsu, Tetsuo; and Konnai, Makato, 4,231,789, Cl. 71-121.000.

Ono, Hiromi: *See*—
Tachibana, Hisataro; and Ono, Hiromi, 4,231,315, Cl. 440-43.000.

ONO Pharmaceutical Co. Ltd.: *See*—
Hayashi, Masaki; Arai, Yoshinobu; Ohuchida, Shuichi; and Hashimoto, Shinsuke, 4,232,009, Cl. 424-180.000.

Onoda, Mamoru: *See*—
Fujita, Isao; Onoda, Mamoru; Kawaguchi, Fumikazu; Takenake, Yoshimichi; and Tsutaya, Tadao, 4,231,797, Cl. 75-256.000.

Oppenlander, Harry; and Wilde, Ulrich, to Thyssen Industrie AG. Shield type support for use in underground mining with lemniscate guide rods. 4,231,684, Cl. 405-291.000.

Orain, Roger; Heuser, Hans; Ohlenforst, Hans; and Pelzer, Rudolf, to Saint-Gobain Industries. Safety window comprising self-healing polymeric layer. 4,232,080, Cl. 428-215.000.

Orr, Thomas S. C.; Hall, David E.; and Mann, John, to Fisons Limited. Composition. 4,232,012, Cl. 424-232.000.

Ort, Morris R., to Cities Service Company. Process for polymerizing olefins. 4,232,140, Cl. 526-129.000.

Ortho Pharmaceutical Corporation: *See*—
Goldstein, Gideon, 4,232,008, Cl. 424-177.000.

Ortner, Herbert; Bahr, Theodor; and Musselmann, Walter, to J. M. Voith GmbH. Process and apparatus for treating waste paper. 4,231,526, Cl. 241-28.000.

Orzessek, Reinhold: *See*—
Behrendt, Wolfgang; Bohnhage, Detlef; Friedemann, Peter; Frolich, Bernhard; and Orzessek, Reinhold, 4,231,667, Cl. 400-208.000.

Osanai, Akira, to Olympus Optical Co., Ltd. Flywheel for small size tape recorder. 4,231,268, Cl. 74-572.000.

Osawa, Masayuki; and Sekine, Masaoki, to TDK Electronics Company Limited. Method of stripping a molded article. 4,231,987, Cl. 264-328.100.

Osbaldeston, Bernard: *See*—
Kutt, Mers; and Osbaldeston, Bernard, 4,231,575, Cl. 273-73.00D.

Osugi, Minoru: *See*—
Yoneoka, Mikio; Osugi, Minoru; and Ikarashi, Takeo, 4,232,171, Cl. 560-239.000.

Osumi, Masato: *See*—
Kanatani, Heiichi; Osumi, Masato; and Hayama, Hajime, 4,231,353, Cl. 126-443.000.

Otsuka, Nobuyuki; and Hirai, Seiichi, to Honda Giken Kogyo Kabushiki Kaisha. Constant velocity universal joint. 4,231,232, Cl. 64-21.000.

Outboard Marine Corporation: *See*—
Bland, Gerald F.; and Payne, Guy D., 4,231,316, Cl. 440-86.000.

Owens-Corning Fiberglas Corporation: *See*—
Carter, Neil A., 4,231,825, Cl. 156-78.000.
Erickson, Thomas D., 4,231,773, Cl. 65-1.000.

Owens-Illinois, Inc.: *See*—
Berg, Charles A., 4,231,772, Cl. 62-2.000.
Graham, Paul W. L.; and Moore, Thomas W., Jr., 4,231,778, Cl. 65-117.000.
Santiago, Edgardo, 4,231,911, Cl. 260-29.6NR.

Oyama, Hirosi: *See*—
Nakagawa, Eishiro; Miyamoto, Taketoshi; Umino, Naozi; and Oyama, Hirosi, 4,231,146, Cl. 29-432.000.

Ozeki, Takeshi: *See*—
Hara, Elmer H.; and Ozeki, Takeshi, 4,232,385, Cl. 370-3.000.

Padgett, Clarence W.: *See*—
Marmet, Melvin L.; and Padgett, Clarence W., 4,232,270, Cl. 330-253.000.

Paegle, Ruta A.; Lidaka, Marger J.; Zhuk, Regina A.; Maurinsh, Juris A.; Zidermane, Aina A.; and Kilevitsa, Marite K. 1-(5-Fluoruracil-1)-2,5-di-O-acetyl-β-D-glucofuranurono-6,3-lactone. 4,232,149, Cl. 536-23.000.

Pagana, Enrico: *See*—
De Padova, Salvatore; Pagana, Enrico; and Rosenga, Giorgio, 4,232,322, Cl. 343-781.00P.

Pai, Damodar M.: *See*—
Limburg, William W.; and Pai, Damodar M., 4,232,103, Cl. 430-59.000.

Painter, Mark C., to Boeing Company, The. Combined shoulder harness and lap belt restraint apparatus having single fasten/release point at lap buckle. 4,231,616, Cl. 297-481.000.

Pall Corporation: *See*—
Seibert, Chesterfield F.; and Miller, John D., 4,231,768, Cl. 55-179.000.

Palladino, Gaetano; and Micciarelli, Mario, to Lark S.p.A. 16,17-Pyrazolino- and 16,17-isopyrazolino-1,4-pregnadiene derivatives. 4,232,013, Cl. 424-241.000.

Palm, Lars-Erik; Nedstedt, Gert; and Nilen, Bengt, to AB Ziristor. Package containing pressured liquid. 4,232,048, Cl. 426-115.000.

Palma, James D., to General Motors Corporation. Electromagnetic fuel injector with selectively hardened armature. 4,231,525, Cl. 239-585.000.

Pantukh, Boris I.: *See*—
Liakumovich, Alexandr G.; Pantukh, Boris I.; and Lesteva, Tatyana M., 4,232,182, Cl. 585-820.000.

Pape, Dieter; and Woerz, Hans, to Heinz Kaiser AG. Dual cutter boring head. 4,231,691, Cl. 408-185.000.

Papp, Alfred; and Harms, Hauke, to Siemens Aktiengesellschaft. Arrangement for the magneto-optical measurement of currents. 4,232,264, Cl. 324-96.000.

Paradis, Stephen G.; Marquis, David M.; and Bakshi, Kiran R., to Chevron Research Company. Maleic anhydride production. 4,231,943, Cl. 260-346.750.

Pardee, Robert P., to Ball Corporation. Protective compositions for recording. 4,232,072, Cl. 428-65.000.

Park, Dong-Sil; Chatterji, Debajyoti; and Breiter, Manfred W., to Electric Power Research Institute, Inc. Sodium-sulfur cell component protected by a high chromium alloy and method for forming. 4,232,098, Cl. 429-104.000.

Park, John K.: *See*—
Logothetis, Eleftherios M.; Laud, Kamlakar R.; and Park, John K., 4,231,254, Cl. 73-362.0AR.

Parker-Hannifin Corporation: *See*—
Scannell, John B., 4,231,579, Cl. 277-205.000.

Parkes, Ralph C., to National Drying Machinery Company. Conveyor system. 4,231,470, Cl. 198-797.000.

Parkhomchuk, Alexei T.: *See*—
Unigovsky, Mikhail R.; Rulevsky, Evgeny V.; Sapa, Fedor I.; Parkhomchuk, Alexei T.; Yampolsky, Arnold S.; Rotenfeld, Veniamin S.; Ivanov, Vasily T.; Nemirovsky, Isaak Y.; Kovalenko, Viktor M.; and Vnuchenko, Nikolai S., 4,231,694, Cl. 409-179.000.

Parks, Donald M. Modular, waste collecting and draining floor apparatus. 4,231,325, Cl. 119-28.000.

Parsons Manufacturing, Incorporated: *See*—
Hannie, Steven G.; and Tucker, Terry D., 4,231,861, Cl. 209-240.000.

Partus, Fred P.: *See*—
Lynch, Brian; and Partus, Fred P., 4,231,777, Cl. 65-109.000.

Pasto, Arvid E.: *See*—
Clark, Grady W.; Holder, John D.; and Pasto, Arvid E., 4,231,796, Cl. 75-206.000.

Patel, Mahesh G.: *See*—
Taplin, David; Weinstein, Marvin J.; Testa, Raymond T.; Marquez, Joseph A.; and Patel, Mahesh G., 4,232,006, Cl. 424-177.000.

Paugstat, John F.; and Girard, Donald J., to NCR Corporation. Data compression system and apparatus. 4,232,375, Cl. 364-900.000.

Paul, Howard C.: *See*—
Hallberg, Irving H.; Paul, Howard C.; Ralston, Ronald R.; and Hunninghaus, Roy E., 4,231,335, Cl. 123-440.000.

Paul, Jeffrey A.: *See*—
Chang, Yu-Wen; and Paul, Jeffrey A., 4,232,401, Cl. 455-328.000.

Pauliukonis, Richard S. Momentary contact reversing diverter. 4,231,399, Cl. 137-625.400.

Paullin, Grover G. Tapered bearing kit for intermediate gear. 4,231,622, Cl. 308-22.000.

Paulus, Philippe; and Hancart, Jules, to Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie. Surface treatment of metal strip. 4,231,812, Cl. 148-6.15R.

Paurat, Friedrich W. Tunnel-excavating machine. 4,231,618, Cl. 299-31.000.

Pawson, Beverly A.: *See—*
Chan, Ka-Kong; and Pawson, Beverly A., 4,231,944, Cl. 260-347.400.

Payne, Guy D.: *See—*
Bland, Gerald F.; and Payne, Guy D., 4,231,316, Cl. 440-86.000.

Pearson, Robert M.; and Weninger, A. Edwin, to Pearson, Robert M. Anesthesia ventilation system. 4,231,362, Cl. 128-205.150.

Peck, Norman J.; Rowland, Thomas J.; and Ashes, John R., to Commonwealth Scientific and Industrial Research Organization. Impact decorticator. 4,231,529, Cl. 241-189.00R.

Peck, Theodore H., to Bausch & Lomb Incorporated. Microscope objective. 4,231,638, Cl. 350-255.000.

Pedersen, Einar, to Pedersen, Einar. Apparatus for welding of stiffeners or the like on a plate. 4,232,209, Cl. 219-137.410.

Peil, William, to General Electric Company. Lighting network including a gas discharge lamp and standby lamp. 4,232,252, Cl. 315-92.000.

Pelcin, Albert L., to Eastern Company, The. Flush-type door lock. 4,231,597, Cl. 292-164.000.

Pelletier, Jean, to Coast Catamaran France S.A. Rudders for boats, particularly for pleasure boats. 4,231,309, Cl. 114-162.000.

Peltier, John W. Evaporative cooler and liquid-gas contact pad therefor. 4,231,975, Cl. 261-99.000.

Pelzer, Rudolf: *See—*
Orain, Roger; Heuser, Hans; Ohlenforst, Hans; and Pelzer, Rudolf, 4,232,080, Cl. 428-215.000.

Pennino, Charles J., to Koppers Company, Inc. Composition for use between polymeric tie plates and cross ties. 4,231,908, Cl. 260-28.5AS.

Pentel Kabushiki Kaisha: *See—*
Nakagawa, Eishiro; Miyamoto, Taketoshi; Umino, Naozi; and Oyama, Hirosi, 4,231,146, Cl. 29-432.000.

Perez, Jose L.; and Jimenez, Humberto A. Tape storage cabinet. 4,231,625, Cl. 312-245.000.

Perfecta Rolladen Karl & Co.: *See—*
Dillitzer, Manfred, 4,232,309, Cl. 340-547.000.

Perkins, Sonnie J. Golf club head alignment apparatus. 4,231,576, Cl. 273-183.00D.

Person, Abraham, to Global Marine, Inc. Flexible ocean upwelling pipe. 4,231,312, Cl. 114-264.000.

Person, Nelson H. Electrical connection system for panel structures. 4,232,183, Cl. 174-48.000.

Persons-Majestic Manufacturing Company: *See—*
Bird, Martin J., 4,231,611, Cl. 297-195.000.

Peter, Cornelius, to Robert Bosch GmbH. Method and apparatus for determining the proportions of the constituents of the air-fuel mixture supplied to an internal combustion engine. 4,231,334, Cl. 123-440.000.

Peter, Dietmar: *See—*
Braun, Walter; Burst, Hermann; and Peter, Dietmar, 4,231,600, Cl. 293-128.000.

Peters, Michael. Hydroplane boat. 4,231,314, Cl. 114-291.000.

Peterson, Larry W., to Shell Oil Company. Herbicide antidotes. 4,231,785, Cl. 71-93.000.

Petersson, Bengt A.: *See—*
Franzen, Olof K.; Hallstrom, Ulf; and Petersson, Bengt A., 4,232,096, Cl. 428-683.000.

Petroleo Brasileiro S.A.-Petrobras: *See—*
Valladares Barrocas, Helcio V; de Castro M. da Silva, Joao B.; and Coutinho de Assis, Ruy, 4,232,179, Cl. 585-640.000.

Petterson, Robert C.; and Loubier, Roger C. Vapor stripping method. 4,231,804, Cl. 134-11.000.

Petterson, Robert C.; and Loubier, Roger C. Vapor stripping process. 4,231,805, Cl. 134-11.000.

Pettibone Corporation: *See—*
Lado, William J., 4,231,698, Cl. 414-624.000.

Peychev, Ivan M.: *See—*
Nikolov, Ivan D.; Chorbov, Iliya G.; and Peychev, Ivan M., 4,231,416, Cl. 164-318.000.

Pez, Guido P., to Allied Chemical Corporation. Lithium dicyclopentadienyl titanium hydride compositions. 4,231,948, Cl. 260-429.500.

Pez, Guido P.: *See—*
Grey, Roger A.; and Pez, Guido P., 4,232,170, Cl. 560-179.000.

Pfizer Inc.: *See—*
Crawford, Thomas C., 4,232,168, Cl. 560-174.000.
Johnson, Michael R., 4,232,018, Cl. 424-248.550.
Schaaf, Thomas K.; and Eggler, James F., 4,232,173, Cl. 562-430.000.

Pfleiderer, Ernst: *See—*
Braeumer, Klaus; Eckmayer, Zdenek; Berg, Alexander; Monsheimer, Rolf; and Pfleiderer, Ernst, 4,232,123, Cl. 435-69.000.

Pflugbeil, Wolf-Dietrich: *See—*
Kramer, Wolfgang; Buchel, Karl H.; Pflugbeil, Wolf-Dietrich; Frohberger, Paul-Ernst; and Brandes, Wilhelm, 4,232,033, Cl. 424-269.000.

Pharmacia Diagnostics AB: *See—*
Carlsson, Jan P. E.; Axen, Rolf E. A. V.; and Drevin, Hakan N. Y., 4,231,999, Cl. 424-1.000.
Carlsson, Jan P. E.; Axen, Rolf E. A. V.; and Drevin, Hakan N. Y., 4,232,119, Cl. 435-7.000.

Pheils, David R., Jr. Method and apparatus for solar heating a building. 4,231,351, Cl. 126-419.000.

Phelon, Russell E.; and Hawken, Henry A., to Power Parts, Inc. Ignition coil and electrical connector therefor. 4,232,284, Cl. 336-90.000.

Philipp, Adolf H.; and Jirkovsky, Ivo L., to American Home Products Corporation. 1-Hydroxyimidazole-5-methanamine derivatives. 4,232,029, Cl. 424-263.000.

Phillippi, Conrad M. Device for calibrating the photometric linearity of optical instruments. 4,231,663, Cl. 356-432.000.

Phillips Petroleum Company: *See—*
Irvin, Howard B.; Lewis, Ronnie L.; and Moczygemba, George A., 4,232,137, Cl. 526-71.000.
Louthan, Rector P., 4,232,167, Cl. 560-154.000.
Needham, Riley B.; Thomas, Charles P.; and Wier, Donald R., 4,231,428, Cl. 166-280.000.
Stewart, William S., 4,231,753, Cl. 23-230.00A.

Physics International Company: *See—*
Smiley, Parker C., 4,231,287, Cl. 92-94.000.

Pierson, Roger P.; Mastalish, Lawrence V.; and Zollar, Daniel J., to Procter & Gamble Company, The. Bundle support for compact dispensing package. 4,231,491, Cl. 221-48.000.

Pifferi, Giorgio: *See—*
Monguzzi, Riccardo; Pifferi, Giorgio; Pinza, Mario; and Broccali, Giampietro, 4,231,927, Cl. 260-239.100.

Pilot Man-Nen-Hitsu Kabushiki Kaisha: *See—*
Tokorozawa, Sadao; Shimizu, Toyoji; and Yoshizawa, Naomi, 4,231,707, Cl. 417-12.000.

Pinza, Mario: *See—*
Monguzzi, Riccardo; Pifferi, Giorgio; Pinza, Mario; and Broccali, Giampietro, 4,231,927, Cl. 260-239.100.

Pioneer Electronic Corporation: *See—*
Yokogawa, Tomohisa, 4,232,395, Cl. 455-173.000.

Pirner, Miroslav; Zoller, Heinrich; and Bichsel, Heinz, to Swiss Aluminium Ltd. Filler metal in a welded assembly. 4,232,095, Cl. 428-654.000.

Pisani, Luigi, to Officina Meccanica Pisani Luigi. Stop motion for band cutting device. 4,231,142, Cl. 29-2.160.

Pitney Bowes Inc.: *See—*
Feinland, Seymour; and Kleinschmitt, David, 4,231,662, Cl. 356-373.000.

Pitts, Frank, to Engelhard Minerals & Chemicals Corporation. Preparation of rare earth nitrates. 4,231,997, Cl. 423-263.000.

Plan-Sell Oy: *See—*
Heikinheimo, Olli, 4,231,460, Cl. 198-341.000.

Plastovets, Ivan K.: *See—*
Kuznetsov, Vyacheslav D.; Preobrazhensky, Boris P.; Rozhnov, Valentin E.; Stepanov, Jury V.; Belitsky, Anatoly N.; Beizer, Viktor N.; Tokar, Grigory A.; Plastovets, Ivan K.; Barylo, Ivan I.; Koval, Boris A.; Chepurnykh, Sergei F.; Chumachenko, Petr N.; Simonov, Nikolai F.; Kharkhardin, Petr P.; and Litmanovich, Ilya M., 4,231,860, Cl. 209-169.000.

Plevak, Lubomir: *See—*
Rosenberg, Harry; and Plevak, Lubomir, 4,231,685, Cl. 405-296.000.

Plueddemann, Edwin P., to Dow Corning Corporation. Primer composition. 4,231,910, Cl. 260-29.40R.

Poetsch, Eike; Uhl, Jurgen; Marx, Dieter; Strehlow, Wighard; Muller-Calgan, Helmut; and Dolce, Giuliano, to Merck Patent Gesellschaft mit beschraenkter Haftung. 3-Fluorobenzodiazepines. 4,232,016, Cl. 414-244.000.

Pohle, Werner P.: *See—*
Aprea, George F.; and Pohle, Werner P., 4,231,524, Cl. 239-468.000.

Pohto, Gerald R.; and Olson, Richard O., to Diamond Shamrock Corporation. Electrode and apparatus for forming the same. 4,231,143, Cl. 29-281.500.

Polaroid Corporation: *See—*
Bloom, Stanley M.; Borror, Alan L.; and Foley, James W., 4,231,929, Cl. 260-243.300.
Davis, Carl W.; and Murray, Joseph E., Jr., 4,231,645, Cl. 354-145.000.
Idelson, Elbert M., 4,231,950, Cl. 260-438.50R.
Raphael, Thomas; and Shulman, Joseph, 4,232,079, Cl. 428-195.000.
Sullivan, Charles I., 4,232,099, Cl. 429-152.000.

Polenov, Alexei S.: *See—*
Adigamov, Engel R.; Gurvich, Yakov A.; Liakumovich, Alexandr G.; Logutov, Igor J.; Michurov, Jury I.; Polenov, Alexei S.; and Yanshevsky, Vladimir A., 4,232,176, Cl. 568-756.000.

Poletto, John F.: *See—*
Siuta, Gerald J.; Conrow, Ransom B.; Poletto, John F.; and Bernstein, Seymour, 4,231,958, Cl. 260-507.00R.

Pollack, Hyman. Shelving system. 4,231,298, Cl. 108-64.000.

Pomper, Seymour; and Akerman, Emanuel, to Standard Brands Incorporated. Preparation of free-flowing particulate yeast. 4,232,045, Cl. 426-62.000.

Ponsford, Roger J., to Beecham Group Limited. Heterocyclic compounds. 4,232,022, Cl. 424-251.000.

Ponsold, Kurt; Prousa, Richard; Oettel, Michael; Strecke, Joachim; and Hoffmann, Herbert, to VEB Jenapharm. 14,15-Methylene derivatives of the estrane series and methods for preparing same. 4,231,946, Cl. 260-397.400.

Poole, Colin: *See—*
Grimshaw, Rex W.; and Poole, Colin, 4,232,091, Cl. 428-472.000.

Popov, Alexandr D.; and Solomin, Vladimir A. Asynchronous line-fed motor. 4,232,237, Cl. 310-13.000.

Popov, George D.; and Robinson, Howard W., to Verbatim Corporation. Tape cassette with improved tape guiding. 4,231,532, Cl. 242-199.000.

Popp, Gerhard: *See—*
Neidig, Arno; Popp, Gerhard; and Gilbers, Gabriele, 4,232,326, Cl. 357-23.000.
Poschel, Bruno P. H.; and Maxwell, Donald R., to Kefalas A/S. Antidepressant methods. 4,232,021, Cl. 424-250.000.
Possati, Mario, to Finike Italiana Marposs S.p.A. Electronic apparatus for checking the linear dimensions of mechanical workpieces. 4,231,158, Cl. 33-149.00J.
Posthuma, Albert E.; and Woodhouse, Robert C. Synthetic physiological mucus. 4,232,003, Cl. 424-81.000.
Potter, George M.: *See—*
Huiatt, Jerry L.; Shurtz, Melvin D.; and Potter, George M., 4,231,859, Cl. 209-11.000.
Potter, Robert T.: *See—*
Corris, Charles J.; Hollingsworth, Charles M.; Kosicki, Witold W.; and Potter, Robert T., 4,231,184, Cl. 46-265.000.
Power Parts, Inc.: *See—*
Phelon, Russell E.; and Hawken, Henry A., 4,232,284, Cl. 336-90.000.
PPG Industries Canada Ltd.: *See—*
Geesen, Donald H., 4,231,840, Cl. 159-47.00R.
PPG Industries, Inc.: *See—*
Carlin, William W., 4,231,813, Cl. 148-6.300.
Kenton, Hobart E.; and Decker, Forrest W., 4,232,218, Cl. 250-222.0PC.
Rahn, Henry W., 4,231,853, Cl. 204-243.00R.
Simon, Martin J., 4,232,090, Cl. 428-424.400.
Wilson, James F.; and Craig, James C., 4,231,827, Cl. 156-214.000.
Preobrazhensky, Boris P.: *See—*
Kuznetsov, Vyacheslav D.; Preobrazhensky, Boris P.; Rozhnov, Valentin E.; Stepanov, Jury V.; Belitsky, Anatoly N.; Beizer, Viktor N.; Tokar, Grigory A.; Plastovets, Ivan K.; Barylo, Ivan I.; Koval, Boris A.; Chepurnykh, Sergei F.; Chumachenko, Petr N.; Simonov, Nikolai F.; Kharkhardin, Petr P.; and Litmanovich, Ilya M., 4,231,860, Cl. 209-169.000.
Price, Anthony G.: *See—*
Edwards, Roy E.; Price, Anthony G.; and Rees, John R., 4,231,224, Cl. 60-581.000.
Prickett, William H., to Gorski, Michael E. Controller for photographic enlarger or the like. 4,231,654, Cl. 355-38.000.
Prince, David G.: *See—*
Boatwright, John T.; Prince, David G.; Haskett, William F.; and Koch, Helmut, 4,232,199, Cl. 179-18.00B.
Prince, Paul R., to Hughes Aircraft Company. Low noise charge coupled device transversal filter. 4,232,279, Cl. 333-165.000.
Pringle, William L.; Hochstein, Peter A.; and Milton, Harold W., Jr. Thermal energy scavenger (rotating wire modules). 4,231,223, Cl. 60-527.000.
Probost, Miroslav, to Deep Steam Extraction (1974) Ltd. Wet vacuum machine. 4,231,133, Cl. 15-300.00A.
Probst, Heinz: *See—*
Gunther, Dieter; Erckel, Rudiger; Rosch, Gunter; and Probst, Heinz, 4,231,741, Cl. 8-571.000.
Process Evaluation & Development Corporation: *See—*
Villavicencio, Eduardo J., 4,231,136, Cl. 19-7.000.
Procter & Gamble Company, The: *See—*
Fawzi, Mahdi B., 4,232,000, Cl. 424-1.000.
Mroz, Judith C.; and Thomas, Dennis A., 4,231,370, Cl. 128-287.000.
Pierson, Roger P.; Mastalish, Lawrence V.; and Zollar, Daniel J., 4,231,491, Cl. 221-48.000.
Professional Mfg. Corp.: *See—*
Iudica, Robert T., 4,231,739, Cl. 433-126.000.
Proffitt, William G., to E-Systems, Inc. Process of defining film patterns on microelectronic substrates by air abrading. 4,232,059, Cl. 427-96.000.
Propst, Robert L.; and Wodka, Michael A., to Herman Miller, Inc. Under the wall energy supply system for a space divider system. 4,231,630, Cl. 339-22.00R.
Proudlock, George T.: *See—*
Falconer, John D.; Proudlock, George T.; and Monsen, Geoffrey, 4,231,484, Cl. 220-89.00A.
Prousa, Richard: *See—*
Ponsold, Kurt; Prousa, Richard; Oettel, Michael; Strecke, Joachim; and Hoffmann, Herbert, 4,231,946, Cl. 260-397.400.
Pullan, Ronald E., to Schlegel (U.K.) Limited. Edge protector trim strip. 4,232,081, Cl. 428-217.000.
Quanta Chemical Ltd.: *See—*
Reilly, Frank, 4,231,736, Cl. 433-6.000.
Quanta-Ray, Inc.: *See—*
Iwata, Akiyoshi, 4,232,276, Cl. 331-94.50D.
Questor Corporation: *See—*
Meeker, Paul K., 4,231,612, Cl. 297-250.000.
Quinan, James R., to Albany International Corp. Corrosion-resistant crucible with graphite parts. 4,231,498, Cl. 222-602.000.
Quinby, Thomas C., to United States of America, Energy. High-temperature, high-pressure bonding of nested tubular metallic components. 4,231,507, Cl. 228-131.000.
Quinn, Daniel P. Adjustable apron of vinyl laminate. 4,231,119, Cl. 2-48.000.
R/m GmbH: *See—*
Braeumer, Klaus; Eckmayer, Zdenek; Berg, Alexander; Monsheimer, Rolf; and Pfleiderer, Ernst, 4,232,123, Cl. 435-69.000.
R. W. Hartnett Company: *See—*
Ackley, Charles E., Sr.; and Ackley, Charles E., Jr., 4,231,462, Cl. 198-380.000.
Rader Companies, Inc.: *See—*
Lund, Arvid, 4,231,495, Cl. 222-345.000.
Radler, Richard W., Jr.: *See—*
Horgan, Anthony M.; and Radler, Richard W., Jr., 4,232,102, Cl. 430-58.000.
Rae, Scott M. Exercising device. 4,231,569, Cl. 272-122.000.
Raffel, Jack I.; and Bernacki, Stephen E., to Massachusetts Institute of Technology. Dielectric isolation method using shallow oxide and polycrystalline silicon utilizing a preliminary etching step. 4,231,819, Cl. 148-175.000.
Rahdener Maschinenfabrik August Kolbus: *See—*
Rathert, Horst, 4,231,466, Cl. 198-479.000.
Rahn, Henry W., to PPG Industries, Inc. Cathodic current conducting elements for use in aluminum reduction cells. 4,231,853, Cl. 204-243.00R.
Raiteri, Angelo, to UNICEM-Unione Cementerie Marchino, Emiliane di Augusta S.p.A.; and Andrea Doria, part interest to each. Valve bag feeding method and machine for powder material packaging apparatus. 4,231,212, Cl. 53-459.000.
Ralston, Ronald R.: *See—*
Hallberg, Irving H.; Paul, Howard C.; Ralston, Ronald R.; and Hunninghaus, Roy E., 4,231,335, Cl. 123-440.000.
Ramey, Joseph F.; Seiler, George A.; and Thompson, Dorman N., Jr., to Minnesota Mining and Manufacturing Company. Notepaper dispenser and tape tabber. 4,231,837, Cl. 156-522.000.
Randhawa, Jagir S., to United States of America, Army. Chemiluminescent method and apparatus for the detection of ozone. 4,232,225, Cl. 250-361.00C.
Randin, Jean-Paul, to Ebauches S.A. Electro-optic device. 4,231,641, Cl. 350-357.000.
Raphael, Thomas; and Shulman, Joseph, to Polaroid Corporation. Novel I.D. cards. 4,232,079, Cl. 428-195.000.
Rasberger, Michael: *See—*
Rody, Jean; and Rasberger, Michael, 4,232,131, Cl. 525-184.000.
Rash, Douglas L., to Viggo AB. Infusion catheter assembly. 4,231,367, Cl. 128-214.400.
Rath, Heinz-Jorg: *See—*
Herzer, Heinz; Rath, Heinz-Jorg; and Schmidt, Dietrich, 4,231,755, Cl. 23-293.00R.
Rathert, Horst, to Rahdener Maschinenfabrik August Kolbus. Book block transport system. 4,231,466, Cl. 198-479.000.
Ray, Asit K.; and Reisman, Arnold, to International Business Machines Corporation. Semiconductor plasma oxidation. 4,232,057, Cl. 427-39.000.
Ray, Leonard N., Jr.: *See—*
Buckwalter, Mervin R.; Bulson, Walter T.; and Ray, Leonard N., Jr., 4,231,743, Cl. 8-471.000.
Raymond Engineering Inc.: *See—*
Bickford, John H.; and Snyder, Robert F., 4,231,454, Cl. 192-4.00R.
Razdan, Raj K.; and Ghosh, Anil C., to Sisa, Incorporated. 17-Cyclobutylmethyl-4,5α-epoxy-3-hydroxy-14-methoxy-8α-methylmorphinan-6-one, and method of treating pain with it. 4,232,028, Cl. 424-260.000.
RCA Corporation: *See—*
Bedford, Alda V., 4,232,186, Cl. 178-22.000.
Dion, Donald F.; and Wojcik, David R., 4,232,376, Cl. 365-222.000.
Fuhrer, Jack S., 4,232,340, Cl. 358-167.000.
Haferl, Peter E., 4,232,254, Cl. 315-408.000.
Henry, William N., 4,231,820, Cl. 148-187.000.
Hinn, Werner, 4,232,268, Cl. 329-103.000.
Hsu, Sheng T., 4,232,327, Cl. 357-23.000.
Leidich, Arthur J., 4,232,273, Cl. 330-298.000.
McCue, Bernard B., 4,232,248, Cl. 313-479.000.
Savoye, Eugene D.; Edwards, Thomas W.; and Wallace, Lloyd F., 4,232,245, Cl. 313-367.000.
Werst, Joseph L., 4,232,283, Cl. 335-212.000.
Re, Luciano; Brandt, Alberto; and Bassignani, Luciano, to Snamprogetti S.p.A. Process for preparing alpha-oxo-esters. 4,232,169, Cl. 560-174.000.
Reagan, William J.: *See—*
Chen, Nai Y.; Miale, Joseph N.; and Reagan, William J., 4,231,899, Cl. 252-455.00Z.
Reed, Kenneth R. B., to Lucas Industries Limited. Road vehicle electrical systems. 4,232,231, Cl. 307-10.00R.
Reed, Kim W.: *See—*
Gould, Larrie A.; and Reed, Kim W., 4,232,398, Cl. 455-226.000.
Rees, John R.: *See—*
Edwards, Roy E.; Price, Anthony G.; and Rees, John R., 4,231,224, Cl. 60-581.000.
Regents for Education of the State of Rhode Island: *See—*
Jackson, Leland B.; and Jaron, Dov, 4,232,373, Cl. 364-572.000.
Regie Nationale des Usines Renault: *See—*
Allibert, Jean-Pierre, 4,231,392, Cl. 137-454.200.
Reich, Frederich R.; and Schwankoff, Albert R., to United States of America, Energy. Method of lightening radiation darkened optical elements. 4,232,228, Cl. 250-492.00R.
Reilly, Frank, to Quanta Chemical Ltd. Orthodontic screw-type device and method of making same. 4,231,736, Cl. 433-6.000.
Reinehr, Dieter; and Gsell, Laurenz, to Ciba-Geigy Corporation. 3-Phenoxybenzylideneamines and 3-benzylbenzylideneamines. 4,231,962, Cl. 564-272.000.
Reineke, Charles E.: *See—*
Burk, George A.; Reineke, Charles E.; and Wilson, Charles A., 4,232,041, Cl. 424-304.000.
Reinhardt, Friedrich: *See—*
Feess, Erich; and Reinhardt, Friedrich, 4,231,745, Cl. 8-552.000.

Reinwall, Ernest W., Jr., to Illinois Tool Works Inc. Adjustable spacer-cam assembly. 4,231,281, Cl. 85-50.0AT.
Reis, Robert V. Safetied exercising board apparatus, and method of safetying exercising board apparatus. 4,231,570, Cl. 272-123.000.
Reisman, Arnold: *See*—
Ray, Asit K.; and Reisman, Arnold, 4,232,057, Cl. 427-39.000.
Relly, Robert H.: *See*—
Hoh, Thomas L.; and Relly, Robert H., 4,232,068, Cl. 428-43.000.
Remia B.V.: *See*—
te Riele, Johannes H., 4,231,397, Cl. 137-614.110.
Remy, Ernst; Meyer, Andreas; and Rieske, Ellen. Microscope slide with electrode arrangement for cell study, and method for its construction. 4,231,660, Cl. 356-244.000.
Rennick, Lyle V.; and Macias, Julian W., to Northrop Corporation. Noise cancellation using tracking filter. 4,232,381, Cl. 367-135.000.
Replin, Henry. Tire structure. 4,231,408, Cl. 152-353.00R.
Republic Steel Corporation: *See*—
Adelsperger, Frederic J., 4,231,792, Cl. 75-53.000.
Research Corporation: *See*—
White, Eugene W.; Hanusiak, William M.; and White, Rodney A., 4,231,979, Cl. 264-81.000.
Retrum, Rowland. Method and apparatus for hydrolyzing keratinaceous material. 4,231,926, Cl. 260-123.700.
Revlon, Inc.: *See*—
Dyson, Evelyna C., 4,232,334, Cl. 358-93.000.
Rheinische Braunkohlwerke AG: *See*—
Weber, Heinrich; Lorenz, Kurt; Dungs, Horst; Kurtz, Roman; and Kersting, Hans-Joachim, 4,231,844, Cl. 201-34.000.
Rhoads, Stanley C.: *See*—
Moser, Kenneth W.; Siemens, Richard E.; and Rhoads, Stanley C., 4,231,866, Cl. 210-660.000.
Rhodes, Cyril E.; and Verburgh, Martin B., to SKF Industrial Trading and Development Company B.V. Sprayed coatings on metal surfaces. 4,232,094, Cl. 428-614.000.
Rhodes, John M.: *See*—
Luke, Roger D.; and Rhodes, John M., 4,231,633, Cl. 339-242.000.
Rhone-Poulenc-Textile: *See*—
Kyritsos, Joseph; and Sacco, Jean, 4,231,913, Cl. 260-30.80R.
Ribeyre, Rene, to Thomson-Brandt. Microphone mount. 4,232,205, Cl. 179-146.00R.
Richards, Mark A., to Tektronix, Inc. No-flash erase of direct viewing bistable storage CRT. 4,232,250, Cl. 315-13.0ST.
Richardson Chemical Company: *See*—
Mallory, Glenn O., Jr., 4,232,060, Cl. 427-98.000.
Ricoh Company, Ltd.: *See*—
Hatsuno, Hiroshi; Fukazawa, Jinpei; Fukushima, Mitsuo; and Ogawa, Shinji, 4,231,251, Cl. 73-119.00A.
Kaneko, Tamaki; Miyakawa, Seiichi; Satomi, Toyokazu; Koizumi, Yutaka; Nakamura, Isao; and Tabata, Yasuhiro, 4,231,561, Cl. 271-3.100.
Nagahara, Yasumori; and Iida, Haruki, 4,231,653, Cl. 355-3.0FU.
Suzuki, Minoru, 4,231,566, Cl. 271-117.000.
Ridenour, Ralph G. Tubing joint assembly. 4,231,596, Cl. 285-382.200.
Rieben, Stuart L., to Westinghouse Electric Corp. Multi-function end effector. 4,231,696, Cl. 414-5.000.
Riechers, Daniel: *See*—
Haberle, Fritz; Riechers, Daniel; and Heusel, Richard, 4,231,601, Cl. 293-136.000
Riegel, Herbert, to Lummus Company, The. Production of hexachlorocyclopentadiene. 4,231,969, Cl. 570-223.000.
Rieske, Ellen: *See*—
Remy, Ernst; Meyer, Andreas; and Rieske, Ellen, 4,231,660, Cl. 356-244.000.
Rigden, Sydney A. R., to General Electric Company Limited. The. High pressure electric discharge lamp. 4,232,243, Cl. 313-217.000.
Riikonen, Pentti. Ski fastening. 4,231,585, Cl. 280-615.000.
Riitano, Francesco; and Spina, Vincenzo. Canal instrument for eliminating interference, widening the opening and the contemporaneous flared reaming of the first two-thirds of the dental radicular canals. 4,231,738, Cl. 433-102.000.
Riker Laboratories, Inc.: *See*—
Moore, George G. I., 4,232,043, Cl. 424-340.000.
Scherrer, Robert A.; and Stern, Richard M., 4,231,965, Cl. 568-327.000.
Riley, Robert Q.; and Carey, David L. Exercise machine with spring-cam arrangement for equalizing the force required through the exercise stroke. 4,231,568, Cl. 272-136.000.
Riley, Terence J.: *See*—
Hartman, Adrian R.; Riley, Terence J.; and Shackle, Peter W., 4,232,328, Cl. 357-49.000.
Riloga-Werk Joachim Schmidt: *See*—
Hehl, Klaus; and Sauer, Hans-Jurgen, 4,231,411, Cl. 160-120.000.
Ring, H. Kenneth, Jr., to Trane Company, The. Pressurized control signal apparatus. 4,231,515, Cl. 236-87.000.
Ringwald, Peter; Rose, Klaus; and Ruhl, Karl, to Robert Bosch GmbH. Procedure and apparatus for degassing fuel supply pump. 4,231,719, Cl. 417-366.000.
Rios, Paul W., to Oatey Co. Apparatus and method for dispensing putty-like material. 4,231,492, Cl. 222-1.000.
Ripka, Chester D., to Carrier Corporation. Method and apparatus for reducing corrosion in a heat exchanger. 4,231,417, Cl. 165-3.000.
Robbins, John D.: *See*—
Netravali, Arun N.; and Robbins, John D., 4,232,338, Cl. 358-136.000.
Robert Bosch GmbH: *See*—
Drews, Ulrich; Schnurle, Hans; Horbelt, Michael; Schmidt, Bernhard; and Werner, Peter, 4,231,345, Cl. 123-510.000.
Heitmann, Jurgen, 4,232,330, Cl. 358-31.000.
Leiber, Heinz, 4,231,620, Cl. 303-119.000.
Peter, Cornelius, 4,231,334, Cl. 123-440.000.
Ringwald, Peter; Rose, Klaus; and Ruhl, Karl, 4,231,719, Cl. 417-366.000.
Ruhl, Karl; and Kemmner, Ulrich, 4,231,718, Cl. 417-366.000.
Schiele, Werner; and Schleupen, Richard, 4,231,348, Cl. 123-644.000.
Strampfer, Armin; and Voegele, Guenther, 4,231,211, Cl. 53-452.000.
Robertson, Charles S.: *See*—
Youden, Robert H.; and Robertson, Charles S., 4,232,367, Cl. 364-408.000.
Robeson, Lloyd M., to Union Carbide Corporation. Impact modified polyarylate blends. 4,231,922, Cl. 260-45.95G.
Robinson, Howard W.: *See*—
Popov, George D.; and Robinson, Howard W., 4,231,532, Cl. 242-199.000.
Rochlitz, Jurgen; and Schon, Gunter, to Hoechst Aktiengesellschaft. Electrophotographic recording material. 4,231,799, Cl. 430-59.000.
Rockwell International Corporation: *See*—
Marmet, Melvin L.; and Padgett, Clarence W., 4,232,270, Cl. 330-253.000.
Rodgers, David P.: *See*—
Levy, John V.; Rodgers, David P.; Stewart, Robert E.; and Casabona, Richard J., 4,232,366, Cl. 364-200.000.
Rody, Jean; and Rasberger, Michael, to Ciba-Geigy Corporation. Polymeric light stabilizers for plastics. 4,232,131, Cl. 525-184.000.
Roesch, Androniki: *See*—
Winter, Werner; Hindermayr, Herman; Roesch, Egon; Roesch, Androniki; and Wilhelms, Otto-Henning, 4,232,024, Cl. 424-251.000.
Roesch, Egon: *See*—
Winter, Werner; Hindermayr, Herman; Roesch, Egon; Roesch, Androniki; and Wilhelms, Otto-Henning, 4,232,024, Cl. 424-251.000.
Rojas, Hernan H., to Comercial e Industrial Sound-Tronic Ltd. High fidelity loudspeaker. 4,232,204, Cl. 179-115.50R.
Rolinski, Edmund J.; and Laub, Bernard, to United States of America, Air Force. Laser tensile test sample holder. 4,231,248, Cl. 73-15.600.
Rolls-Royce Limited: *See*—
Chapman, John F., 4,231,447, Cl. 181-213.000.
Rolodex Corporation, The: *See*—
Neilsen, Hildaur L., 4,231,624, Cl. 312-186.000.
Rombi, Max: *See*—
Dick, Pierre R.; and Rombi, Max, 4,232,023, Cl. 424-251.000.
Romey, Ingo; and Kokot, Hellmut, to Bergwerksverband GmbH. Purifying filter-clogging coal tar formed from low-temperature coal carbonization. 4,231,856, Cl. 208-39.000.
Roming, Derek, to International Design Systems, Ltd. Process and apparatus for forming concrete. 4,231,677, Cl. 404-89.000.
Rosbiegalle, Rudolf; Farber, Karl; Grimm, Herbert; Schmeisser, Helmut; Schonhut, Hermann; Krumnikl, Svatopluk; and Edel, Gunter, to A.W. Faber-Castell. Device for receiving a writing implement. 4,231,669, Cl. 401-258.000.
Rosch, Gunter: *See*—
Gunther, Dieter; Erckel, Rudiger; Rosch, Gunter; and Probst, Heinz, 4,231,741, Cl. 8-571.000.
Rose, Dennis L.: *See*—
Lavin, Walter M.; McFarlane, James I.; and Rose, Dennis L., 4,231,894, Cl. 252-389.00A.
Rose, John B.: *See*—
Barr, Dennis A.; and Rose, John B., 4,232,142, Cl. 528-125.000.
Rose, Klaus: *See*—
Ringwald, Peter; Rose, Klaus; and Ruhl, Karl, 4,231,719, Cl. 417-366.000.
Rosenberg, Harry; and Plevak, Lubomir, to Gewerkschaft Eisenhutte Westfalia. Roof support unit. 4,231,685, Cl. 405-296.000.
Rosenga, Giorgio: *See*—
De Padova, Salvatore; Pagana, Enrico; and Rosenga, Giorgio, 4,232,322, Cl. 343-781.00P.
Rosler, Richard S.; and East, Robert W., to Applied Materials, Inc. Chemical vapor deposition reactor and process. 4,232,063, Cl. 427-94.000.
Rotenfeld, Veniamin S.: *See*—
Unigovsky, Mikhail R.; Rulevsky, Evgeny V.; Sapa, Fedor I.; Parkhomchuk, Alexei T.; Yampolsky, Arnold S.; Rotenfeld, Veniamin S.; Ivanov, Vasily T.; Nemirovsky, Isaak Y.; Kovalenko, Viktor M.; and Vnuchenko, Nikolai S., 4,231,694, Cl. 409-179.000.
Roth, Gunther;, to Sunvic Regler GmbH. Pneumatic controller. 4,231,385, Cl. 137-86.000.
Roth, Milton, to United States of America, Army. Non-polluting process for desensitizing explosives. 4,231,822, Cl. 149-109.600.
Roussel Uclaf: *See*—
Dumont, Claude; Guillaume, Jacques; and Nedelec, Lucien, 4,232,031, Cl. 424-263.000.
Martel, Jacques; Tessier, Jean; and Demoute, Jean-Pierre, 4,231,932, Cl. 260-326.00A.
Teutsch, Jean G.; and Deraedt, Roger, 4,232,015, Cl. 424-243.000.
Rowland, Thomas J.: *See*—
Peck, Norman J.; Rowland, Thomas J.; and Ashes, John R., 4,231,529, Cl. 241-189.00R.

Royal Crown Cola Company: *See—*
Walker, Maurice; Wheeley, Buren R.; and Glass, Charles A., 4,231,209, Cl. 53-48.000.

Rozhnov, Valentin E.: *See—*
Kuznetsov, Vyacheslav D.; Preobrazhensky, Boris P.; Rozhnov, Valentin E.; Stepanov, Jury V.; Belitsky, Anatoly N.; Beizer, Viktor N.; Tokar, Grigory A.; Plastovets, Ivan K.; Barylo, Ivan I.; Koval, Boris A.; Chepurnykh, Sergei F.; Chumachenko, Petr N.; Simonov, Nikolai F.; Kharkhardin, Petr P.; and Litmanovich, Ilya M., 4,231,860, Cl. 209-169.000.

Ruckert, Hans, to Vereinigte Elektrizitatswerke Westfalen AG. Device for cathodic corrosion protection employing an external current anode. 4,231,852, Cl. 204-196.000.

Rueffel, Philip G., to Saskatchewan Minerals. Thermal energy storage composition comprising peat moss. 4,231,885, Cl. 252-70.000.

Ruhl, Karl; and Kemmner, Ulrich, to Robert Bosch GmbH. Fluid pump, particularly a fuel supply pump. 4,231,718, Cl. 417-366.000.

Ruhl, Karl: *See—*
Ringwald, Peter; Rose, Klaus; and Ruhl, Karl, 4,231,719, Cl. 417-366.000.

Ruhrkohle, AG.: *See—*
Mathiak, Hans; and Oldengott, Hans, 4,231,846, Cl. 202-248.000.

Rule, Charles E.; Manning, Robert G.; and Zielinski, Richard J., to SCM Corporation. Imitation acid-set cheese. 4,232,050, Cl. 426-582.000.

Rulevsky, Evgeny V.: *See—*
Unigovsky, Mikhail R.; Rulevsky, Evgeny V.; Sapa, Fedor I.; Parkhomchuk, Alexei T.; Yampolsky, Arnold S.; Rotenfeld, Veniamin S.; Ivanov, Vasily T.; Nemirovsky, Isaak Y.; Kovalenko, Viktor M.; and Vnuchenko, Nikolai S., 4,231,694, Cl. 409-179.000.

Rumianca S.p.A.: *See—*
Baldi, Luciano; Francese, Renato; and Collecchia, Franco, 4,232,153, Cl. 544-204.000.

Runkel, Manfred A.: *See—*
Smith, Alan C.; and Runkel, Manfred A., 4,231,284, Cl. 91-171.000.

Russo, Giovanni: *See—*
Limone, Mario; Russo, Giovanni; Magliuolo, Umberto; and Sardella, Salvatore, 4,231,458, Cl. 194-4.00F.

Ruuska, Mauno, to Lannen Tehtaat Oy. Group of pots for nursing and replanting plants. 4,231,186, Cl. 47-74.000.

Ryan, John R.; and Shalita, Paul, to Ferro Corporation. Process for preparing reflecting sheeting having wide angle response. 4,231,830, Cl. 156-232.000.

Ryan, Keith. Visible indexes. 4,231,176, Cl. 40-395.000.

Sacco, Jean: *See—*
Kyritsos, Joseph; and Sacco, Jean, 4,231,913, Cl. 260-30.80R.

Safir, Sidney R.: *See—*
Fanshawe, William J.; Epstein, Joseph W.; Crawley, Lantz S.; Hofmann, Corris M.; and Safir, Sidney R., 4,231,935, Cl. 260-326.50B.

Safranek, Edward J.: *See—*
Kuhl, Bernhard R.; and Safranek, Edward J., 4,232,207, Cl. 200-11.00R.

Saft-Societe des Accumulateurs Fixes et de Traction: *See—*
Guerinault, Jean-Marc; and Barber, Jacques, 4,231,631, Cl. 339-94.00A.
Lelaidier, Daniel; and Godard, Pierre, 4,232,305, Cl. 340-384.00E.

Sagawa, Takatoshi: *See—*
Kato, Tadanari; Ikemi, Tadashi; and Sagawa, Takatoshi, 4,231,900, Cl. 252-466.0PT.

Saint-Gobain Industries: *See—*
Orain, Roger; Heuser, Hans; Ohlenforst, Hans; and Pelzer, Rudolf, 4,232,080, Cl. 428-215.000.

Sair, Louis; and Sair, Ralph A., to Griffith Laboratories U.S.A., Inc. Food supplement concentrate in a dense glasseous extrudate. 4,232,047, Cl. 426-96.000.

Sair, Ralph A.: *See—*
Sair, Louis; and Sair, Ralph A., 4,232,047, Cl. 426-96.000.

Saito, Akihiro; and Naoi, Keigo, to Hitachi, Ltd. Rectifier assembly for AC generators for use with vehicles. 4,232,238, Cl. 310-68.00D.

Saito, Isao: *See—*
Sakamoto, Seiya; Hohki, Tetsuo; and Saito, Isao, 4,232,344, Cl. 358-298.000.

Saito, Jun: *See—*
Ichikawa, Junji; Takahashi, Yuji; and Saito, Jun, 4,231,565, Cl. 271-105.000.

Saito, Katsunori: *See—*
Kokaji, Norio; Kinoshita, Kunio; Urano, Toshihiro; and Saito, Katsunori, 4,232,323, Cl. 346-74.100.

Saito, Toshihisa; and Inoue, Nobuyoshi, to Copal Company Limited. Blade type focal plane shutter. 4,231,650, Cl. 354-246.000.

Saito, Tsutomu, to Horikiri Spring Manufacturing Co., Ltd. Bar-shaped torsion spring. 4,231,555, Cl. 267-154.000.

Saitoh, Osamu: *See—*
Ohnishi, Toshikazu; Ishida, Kozo; and Saitoh, Osamu, 4,232,223, Cl. 250-343.000.

Sakakibara, Yasuyuki, to Nippon Soken, Inc. Multiitem indicating device. 4,232,303, Cl. 340-366.00R.

Sakamoto, Masakatsu; Uchida, Kenji; and Kamino, Yukishige, to Hitachi, Ltd. Control system of apparatus for transporting slurry. 4,231,686, Cl. 406-14.000.

Sakamoto, Seiya; Hohki, Tetsuo; and Saito, Isao, to Dainippon Screen Seizo Kabushiki Kaisha. Device for reproducing a halftone picture by scanning. 4,232,344, Cl. 358-298.000.

Sakashita, Nobuyuki: *See—*
Nishiyama, Ryuzo; Takahashi, Ryohei; Fujikawa, Kanichi; Nasu, Rikuo; and Sakashita, Nobuyuki, 4,231,787, Cl. 71-107.000.

Sakurai, Soichi; Ando, Kunio; and Fukuzawa, Kenichi, to Hitachi, Ltd. Electron gun assembly for a color picture tube. 4,232,246, Cl. 313-414.000.

Samejima, Hirotoshi: *See—*
Chiba, Hideo; Sasaki, Ryuzo; Yoshikawa, Masaaki; Takahashi, Naofumi; Sugimoto, Etsuro; and Samejima, Hirotoshi, 4,232,044, Cl. 426-44.000.

Sample, Lawrence R.: *See—*
Dobkin, Robert C.; Isbell, Tim D.; Miller, Bernard D.; and Sample, Lawrence R., 4,232,271, Cl. 330-258.000.

Sanborn, James R.; and Tieman, Charles H., to Shell Oil Company. Polymeric insecticidal compositions of matter. 4,232,025, Cl. 424-256.000.

Sandberg, Richard G.; and Hebble, Terry L., to United States of America, Interior. Recovery of metal values from lead smelter matte. 4,231,993, Cl. 423-34.000.

Sanders, Nathaniel L.: *See—*
Inouye, George T.; Sanders, Nathaniel L.; and Moss, Winston C., 4,232,070, Cl. 428-49.000.

Sandham, Edwin C., to Leggett & Platt, Incorporated. Pedestal seat base. 4,231,539, Cl. 248-418.000.

Sando Iron Works Co.: *See—*
Sando, Yoshikazu; and Ishidoshiro, Hiroshi, 4,231,238, Cl. 68-62.000.

Sando, Yoshikazu; and Ishidoshiro, Hiroshi, to Sando Iron Works Co. Apparatus for the liquid treatment of a cloth. 4,231,238, Cl. 68-62.000.

Sandoz Ltd.: *See—*
Closse, Annemarie; Haefliger, Walter; and Hauser, Daniel, 4,232,039, Cl. 424-278.000.

Santek, Inc.: *See—*
Finger, Richard H.; and Michel, Thomas J., 4,232,355, Cl. 361-235.000.

Santiago, Edgardo, to Owens-Illinois, Inc. Abrasion resistant coating for foamed plastic substrates. 4,231,911, Cl. 260-29.6NR.

Sanyo Electric Co., Ltd.: *See—*
Kanatani, Heiichi; Osumi, Masato; and Hayama, Hajime, 4,231,353, Cl. 126-443.000.

Sapa, Fedor I.: *See—*
Unigovsky, Mikhail R.; Rulevsky, Evgeny V.; Sapa, Fedor I.; Parkhomchuk, Alexei T.; Yampolsky, Arnold S.; Rotenfeld, Veniamin S.; Ivanov, Vasily T.; Nemirovsky, Isaak Y.; Kovalenko, Viktor M.; and Vnuchenko, Nikolai S., 4,231,694, Cl. 409-179.000.

Sardella, Salvatore: *See—*
Limone, Mario; Russo, Giovanni; Magliuolo, Umberto; and Sardella, Salvatore, 4,231,458, Cl. 194-4.00F.

Sasaki, Masayuki: *See—*
Oida, Yoshio; Sasaki, Masayuki; and Semi, Hidetoshi, 4,232,210, Cl. 219-10.55C.

Sasaki, Ryuzo: *See—*
Chiba, Hideo; Sasaki, Ryuzo; Yoshikawa, Masaaki; Takahashi, Naofumi; Sugimoto, Etsuro; and Samejima, Hirotoshi, 4,232,044, Cl. 426-44.000.

Saskatchewan Minerals: *See—*
Rueffel, Philip G., 4,231,885, Cl. 252-70.000.

Satellite Business Systems: *See—*
Lyons, Michael T., 4,231,537, Cl. 244-160.000.

Sato, Haruki: *See—*
Kawasumi, Yoshio; and Sato, Haruki, 4,231,848, Cl. 204-20.000.

Sato, Shigeru: *See—*
Iwasaki, Masayuki; Sato, Shigeru; Inoue, Yasuo; and Nagashima, Akira, 4,232,106, Cl. 430-170.000.

Sato, Tetsuo: *See—*
Chaki, Eiichi; Chiba, Taneaki; and Sato, Tetsuo, 4,232,316, Cl. 343-108.00R.

Satoh, Eiji; Kohama, Masayuki; Yokoya, Kunihiko; Yamada, Kenji; and Nemoto, Akira, to Oiles Industries Co., Ltd.; and Musashi Seimitsu Kogyo Kabushiki Kaisha. Ball joint and a method for manufacturing the ball joint. 4,231,673, Cl. 403-125.000.

Satoh, Ken; and Yanagida, Tuneo, to Olympus Optical Co., Ltd. Tape end warning apparatus. 4,232,348, Cl. 360-74.100.

Satomi, Toyokazu: *See—*
Kaneko, Tamaki; Miyakawa, Seiichi; Satomi, Toyokazu; Koizumi, Yutaka; Nakamura, Isao; and Tabata, Yasuhiro, 4,231,561, Cl. 271-3.100.

Satzinger, Gerhard; Herrmann, Manfred F.; and Hechtfischer, Gustav, to Warner-Lambert Company. Novel 3-hydroxy-pyrrolin-2-one derivatives. 4,231,933, Cl. 260-326.5FL.

Sauer, Hans-Jurgen: *See—*
Hehl, Klaus; and Sauer, Hans-Jurgen, 4,231,411, Cl. 160-120.000.

Saunders, Michael A.; and Irwin, Robert W., to Burroughs Corporation. Logic card frame. 4,232,356, Cl. 361-415.000.

Savalle, Rene, Jr., to Andrew Corporation. Mount for earth station antenna. 4,232,320, Cl. 343-765.000.

Savin Corporation: *See—*
Hori, Tatsu, 4,231,562, Cl. 271-3.100.

Savoye, Eugene D.; Edwards, Thomas W.; and Wallace, Lloyd F., to RCA Corporation. Reduced blooming devices. 4,232,245, Cl. 313-367.000.

Scannell, John B., to Parker-Hannifin Corporation. Sealing ring. 4,231,579, Cl. 277-205.000.

Scarberry, Eugene N. Emergency resuscitation apparatus. 4,231,365, Cl. 128-207.150.

Schaaf, Thomas K.; and Eggler, James F., to Pfizer Inc. 15-Sulfonamidoprostaglandin derivatives. 4,232,173, Cl. 562-430.000.

Schaeffer, Bernard J., to Amax Inc. Grinding mill shell liner elements. 4,231,528, Cl. 241-182.000.

Schael, Wilfried, to Dr. Eduard Fresenius Chemisch-Pharmazeutische Industrie KG Apparatebau KG. Blood flow monitoring and control apparatus. 4,231,366, Cl. 128-214.00E.

Schafer, David E.: *See*—
Czajkowski, Albert J.; and Schafer, David E., 4,231,786, Cl. 71-100.000.

Schaffernicht, Klaus; and Kolbeck, Rainer, to Licentia Patent-Verwaltungs-GmbH. Electron beam tube. 4,231,627, Cl. 316-25.000.

Schaper, Lambert; and Sie, Swan T., to Shell Oil Company. Process for the preparation of an aromatic hydrocarbon mixture using iron crystalline silicates. 4,232,178, Cl. 585-408.000.

Scharf, Gerson: *See*—
Weiss, Gerald; Scharf, Gerson; Guido, Anthony A.; and Lazardwitz, Benjamin, 4,232,187, Cl. 178-22.000.

Schechter, Michael M., to Ford Motor Company. Variable rate aneroid capsule. 4,231,285, Cl. 92-34.000.

Scheidegger, Albert. Closure caps adapted for distribution in a channel. 4,231,479, Cl. 215-250.000.

Scherenberg, Hans O.; and Andres, Rudolf, to Daimler-Benz Aktiengesellschaft. Arrangement of a three-point automatic belt. 4,231,592, Cl. 280-808.000.

Schering Corporation: *See*—
McCombie, Stuart, 4,231,945, Cl. 260-347.700.
Taplin, David; Weinstein, Marvin J.; Testa, Raymond T.; Marquez, Joseph A.; and Patel, Mahesh G., 4,232,006, Cl. 424-177.000.

Scherrer, Robert A.; and Stern, Richard M., to Riker Laboratories, Inc. Phenoxy phenyl ethanones. 4,231,965, Cl. 568-327.000.

Schiele, Werner; and Schleupen, Richard, to Robert Bosch GmbH. Ignition system with ignition current and minimum spark duration controls. 4,231,348, Cl. 123-644.000.

Schlanzke, Claus G.: *See*—
Beerens, Hugo; Feldmann, Hugo; and Schlanzke, Claus G., 4,231,553, Cl. 266-113.000.

Schlegel (U.K.) Limited: *See*—
Pullan, Ronald E., 4,232,081, Cl. 428-217.000.

Schlegel, William R.; and Mayhew, Harry E., to All American Industries, Inc. Composite tape for arresting landing aircraft. 4,231,535, Cl. 244-110.00C.

Schletter, Peter, to DEC GmbH. Milk quantity meter. 4,231,324, Cl. 119-14.170.

Schleupen, Richard: *See*—
Schiele, Werner; and Schleupen, Richard, 4,231,348, Cl. 123-644.000.

Schloemann-Siemag Aktiengesellschaft: *See*—
Beerens, Hugo, 4,231,382, Cl. 134-64.00R.
Beerens, Hugo; Feldmann, Hugo; and Schlanzke, Claus G., 4,231,553, Cl. 266-113.000.

Schlumberger Technology Corporation: *See*—
Hertzog, Russel C., 4,232,220, Cl. 250-270.000.

Schmeisser, Helmut: *See*—
Rosbiegalle, Rudolf; Farber, Karl; Grimm, Herbert; Schmeisser, Helmut; Schonhut, Hermann; Krumnikl, Svatopluk; and Edel, Gunter, 4,231,669, Cl. 401-258.000.

Schmid, Eduard; and Griehl, Wolfgang, to Inventa AG fur Forschung und Patentverwertung, Zurich. Injection moldable glass clear transparent polyamide. 4,232,145, Cl. 528-324.000.

Schmid, Manfred; Elsaber, Martin; and Weik, Manfred, to Sulzer Morat GmbH. Assembly plate for assembling cam parts of a knitting machine. 4,231,234, Cl. 66-27.000.

Schmidt, Alfred, to OMV Aktiengesellschaft. Process for the purification of urea solutions containing biuret and the like. 4,231,960, Cl. 564-73.000.

Schmidt, Bernhard: *See*—
Drews, Ulrich; Schnurle, Hans; Horbelt, Michael; Schmidt, Bernhard; and Werner, Peter, 4,231,345, Cl. 123-510.000.

Schmidt, Dietrich: *See*—
Herzer, Heinz; Rath, Heinz-Jorg; and Schmidt, Dietrich, 4,231,755, Cl. 23-293.00R.

Schmidt, Manfred; Bandtel, Eberhard; Traudisch, Walter; Spott, Georg; and Freitag, Dieter, to Bayer Aktiengesellschaft. Process for isolating boron-containing phenol/formaldehyde resins. 4,232,134, Cl. 525-506.000.

Schmidt, Paul F., to Bell Telephone Laboratories, Incorporated. Method of removing impurity metals from semiconductor devices. 4,231,809, Cl. 148-1.500.

Schmitt, Frederick L.: *See*—
Sprecker, Mark A.; Schmitt, Frederick L.; Vock, Manfred H.; Vinals, Joaquin F.; and Kiwala, Jacob, 4,231,940, Cl. 260-345.100.

Schneider, Abraham: *See*—
Seitzer, Walter H.; and Schneider, Abraham, 4,231,858, Cl. 208-89.000.

Schneider Medintag AG: *See*—
Gleichner, Hans, 4,231,715, Cl. 417-307.000.

Schnurle, Hans: *See*—
Drews, Ulrich; Schnurle, Hans; Horbelt, Michael; Schmidt, Bernhard; and Werner, Peter, 4,231,345, Cl. 123-510.000.

Schoker, Hans, to Casma Di V. Marinoni & Figli. Automatic door closing arrangement. 4,231,134, Cl. 16-49.000.

Scholder, William G.: *See*—
Hall, James F., Jr.; Lake, Ralph J., Jr.; and Scholder, William G., 4,231,439, Cl. 177-25.000.

Scholze, Alfred O.: *See*—
Williams, Thomas A.; and Scholze, Alfred O., 4,232,362, Cl. 362-410.000.

Schon, Gunter: *See*—
Rochlitz, Jurgen; and Schon, Gunter, 4,231,799, Cl. 430-59.000.

Schonhut, Hermann: *See*—
Rosbiegalle, Rudolf; Farber, Karl; Grimm, Herbert; Schmeisser, Helmut; Schonhut, Hermann; Krumnikl, Svatopluk; and Edel, Gunter, 4,231,669, Cl. 401-258.000.

Schramm, Hans; and Schramm, Klaus, to Frank & Schulte GmbH. Alloy carrier for charging cupola furnaces. 4,231,798, Cl. 75-256.000.

Schramm, Klaus: *See*—
Schramm, Hans; and Schramm, Klaus, 4,231,798, Cl. 75-256.000.

Schreck, Philipp; and Buck, Gerold A. Method and apparatus for in-situ production of concrete slabs. 4,231,977, Cl. 264-33.000.

Schrock, Richard R., to Massachusetts Institute of Technology. Tantalum and niobium catalysts or catalyst precursors. 4,231,947, Cl. 260-429.00R.

Schuierer, Manfred: *See*—
Gresens, Harry; and Schuierer, Manfred, 4,231,165, Cl. 34-28.000.

Schut, Robert N.; Snoke, Edgar O.; and Van Dyke, John W., Jr., to Miles Laboratories, Inc. Isoquinoline propionamides exhibiting analgesic properties. 4,232,160, Cl. 546-146.000.

Schwab, Klaus M.; and Kahrbek, Detlev, to International Educational Services AG. Method of dynamic representation and apparatus therefor. 4,231,655, Cl. 355-40.000.

Schwankoff, Albert R.: *See*—
Reich, Frederich R.; and Schwankoff, Albert R., 4,232,228, Cl. 250-492.00R.

Schwartz, Robert W.: *See*—
Stewart, Robert M.; and Schwartz, Robert W., 4,231,227, Cl. 62-57.000.

Schweickert, Hermann: *See*—
Merkle, Theodor; Hausenblas, Bernhard; Schweickert, Hermann; and Wengert, Dieter, 4,231,594, Cl. 285-3.000.

Schwierz, Theodor, to Siemens Aktiengesellschaft. Measuring installation for frequency analysis of signal levels within a large amplitude range. 4,232,263, Cl. 324-77.00B.

SCM Corporation: *See*—
Rule, Charles E.; Manning, Robert G.; and Zielinski, Richard J., 4,232,050, Cl. 426-582.000.

Scotney, Gerald H.: *See*—
Still, Robert C.; Huppenthal, Frank J.; Smith, Barbara J.; and Scotney, Gerald H., 4,231,389, Cl. 137-315.000.

Scott & Fetzer Company, The: *See*—
Lee, Maw H.; and Keim, John E., 4,232,308, Cl. 340-539.000.

Scott, Morton J. Air cleaning apparatus and method. 4,231,765, Cl. 55-90.000.

Scozzafava, Milton V. Mounting device. 4,231,675, Cl. 403-252.000.

Sea Solar Power: *See*—
Anderson, J. Hilbert, 4,231,420, Cl. 165-40.000.

Security Plastics Inc.: *See*—
Kutik, Louis F.; and Cecil, Howard E., 4,231,493, Cl. 222-321.000.

Sedlak, Michael: *See*—
Moore, Edward J.; and Sedlak, Michael, 4,231,752, Cl. 23-230.0HC.

Sehring, Richard: *See*—
Becher, Manfred; and Sehring, Richard, 4,232,172, Cl. 562-423.000.

Seib, David H.: *See*—
Millea, Michael F.; and Seib, David H., 4,232,221, Cl. 250-311.000.

Seibert, Chesterfield F.; and Miller, John D., to Pall Corporation. Air purification system and process. 4,231,768, Cl. 55-179.000.

Seidel, Gerhard E.: *See*—
Nash, Gilbert J.; and Seidel, Gerhard E., 4,231,481, Cl. 220-1.500.

Seike, Shoji: *See*—
Higuchi, Noboru; Ogasawara, Takayuki; and Seike, Shoji, 4,232,185, Cl. 174-140.00C.

Seiko Koki Kabushiki Kaisha: *See*—
Kitai, Kiyoshi; and Takazawa, Yuzuru, 4,231,647, Cl. 354-195.000.
Kitai, Kiyoshi; Nakagawa, Tadashi; and Ishida, Hiroaki, 4,231,648, Cl. 354-195.000.

Seiler, George A.: *See*—
Ramey, Joseph F.; Seiler, George A.; and Thompson, Dorman N., Jr., 4,231,837, Cl. 156-522.000.

Seiller, Pierre F. X. Clasp fastener. 4,231,380, Cl. 132-47.000.

Seitzer, Walter H.; and Schneider, Abraham, to Suntech, Inc. Processing shale oil to jet fuel. 4,231,858, Cl. 208-89.000.

Sekine, Masaoki: *See*—
Osawa, Masayuki; and Sekine, Masaoki, 4,231,987, Cl. 264-328.100.

Semi, Hidetoshi: *See*—
Oida, Yoshio; Sasaki, Masayuki; and Semi, Hidetoshi, 4,232,210, Cl. 219-10.55C.

Sequeira, Avilino, Jr.; and Barger, Frank L., to Texaco Inc. Control system for an N-methyl-2-pyrrolidone refining unit receiving light sweet charge oil. 4,231,459, Cl. 196-46.000.

Shackle, Peter W.: *See*—
Hartman, Adrian R.; Riley, Terence J.; and Shackle, Peter W., 4,232,328, Cl. 357-49.000.

Shafer, Merrill W.: *See*—
Chang, Ifay F.; and Shafer, Merrill W., 4,231,892, Cl. 252-301.60F.

Shaffer, Donald O., to Champion Spark Plug Company. Automatic color change electrostatic paint spray system. 4,232,055, Cl. 427-33.000.

Shaffer, Gene P. Wheelchair. 4,231,614, Cl. 297-330.000.

Shalita, Paul: *See—*
Ryan, John R.; and Shalita, Paul, 4,231,830, Cl. 156-232.000.
Shanks, Howard R.; Bevolo, Albert J.; Danielson, Gordon C.; and Weber, Michael F., to United States of America, Energy. Fuel cell oxygen electrode. 4,232,097, Cl. 429-44.000.
Sharp, Joseph. Multifuel self-regulating burner. 4,231,731, Cl. 431-38.000.
Sharp Kabushiki Kaisha: *See—*
Funada, Fumiaki; Nonomura, Keisaku; Uede, Hisashi; and Wada, Tomio, 4,231,640, Cl. 350-336.000.
Yasuda, Syoichi; and Nishioka, Yoshiki, 4,232,290, Cl. 340-146.30Z.
Shaw, Anthony R.; Krueger, Wallace F.; and Bastian, Lloyd E., to Libbey-Owens-Ford Company. Method and apparatus for producing solar collector panels. 4,231,505, Cl. 228-14.000.
Shaw, Anthony R.: *See—*
Krueger, Wallace F.; and Shaw, Anthony R., 4,231,204, Cl. 52-397.000.
Shealy, Y. Fulmer; and O'Dell, C. Allen, to United States of America, America. Carbocyclic analogs of cytosine nucleosides exhibiting antiviral and antineoplasticactivity. 4,232,154, Cl. 544-250.000.
Shedd, Francis A.: *See—*
Wrast, Richard E.; Gardiner, William J.; and Shedd, Francis A., 4,231,826, Cl. 156-138.000.
Shell Oil Company: *See—*
Ensing, Lukas, 4,232,379, Cl. 367-43.000.
Peterson, Larry W., 4,231,785, Cl. 71-93.000.
Sanborn, James R.; and Tieman, Charles H., 4,232,025, Cl. 424-256.000.
Schaper, Lambert; and Sie, Swan T., 4,232,178, Cl. 585-408.000.
Shelton, Winston L. Filter aid dispensing arrangement. 4,231,665, Cl. 366-165.000.
Sheng, Ming N.: *See—*
Kao, Jar-lin; and Sheng, Ming N., 4,231,937, Cl. 260-340.200.
Shenoha, James L., to Norwood Marking & Equipment Co. Multiple head marking device. 4,231,290, Cl. 101-93.110.
Shepard, John S. Shelf bracket assembly. 4,231,300, Cl. 108-111.000.
Shepard, Kenneth L.; and Brenner, Daniel G., to Merck & Co., Inc. 10,11-Dihydro-5H-dibenzo[a,d]cyclohepten-5,10-imines. 4,232,158, Cl. 546-72.000.
Sherman, John D.: *See—*
Denny, Arthur F.; and Sherman, John D., 4,231,887, Cl. 252-174.190.
Sherwin-Williams Company, The: *See—*
Groth, Hugh F.; Vogel, John D.; and Hunt, Guilbert M., 4,231,668, Cl. 401-146.000.
Shibata, Toshiaki: *See—*
Kajihara, Motoyoshi; Hamakawa, Toshihiro; Shibata, Toshiaki; Suzue, Takashi; and Fujii, Setsuro, 4,232,007, Cl. 424-177.000.
Shibuya Kogyo Kabushikigaisha: *See—*
Okazaki, Gosei, 4,231,213, Cl. 53-497.000.
Shigeta, Yasuo: *See—*
Hanajima, Hidemitsu; and Shigeta, Yasuo, 4,232,267, Cl. 328-138.000.
Shih, David H.: *See—*
Christensen, Burton G.; and Shih, David H., 4,232,036, Cl. 424-274.000.
Shimano Industrial Company, Limited: *See—*
Fujii, Yuji, 4,231,451, Cl. 188-73.100.
Shimizu, Toyoji: *See—*
Tokorozawa, Sadao; Shimizu, Toyoji; and Yoshizawa, Naomi, 4,231,707, Cl. 417-12.000.
Shin-Etsu Chemical Co., Ltd.: *See—*
Koyanagi, Shunichi; Kitamura, Hajime; and Kurimoto, Kazuhiko, 4,232,141, Cl. 526-344.200.
Shing-Hsiung, Wu. Sea water lifting device. 4,231,712, Cl. 417-100.000.
Shingu, Tetsuro: *See—*
Touyama, Ryousuke; Inouye, Hiroyuki; Shingu, Tetsuro; Takeda, Yoshio; Ikumoto, Takeshi; Okuyama, Hidetoshi; and Yamamoto, Osamu, 4,232,159, Cl. 546-112.000.
Shinoda, Yoshio: *See—*
Yoshino, Yasuhisa; Kuno, Akira; and Shinoda, Yoshio, 4,231,257, Cl. 73-432.0CR.
Shinohara, Akira; Wada, Nobuhide; Tokunaga, Yukio; and Yazawa, Chihiro, to Ihara Chemical Industry Company, Limited. Process for producing aminophenol ether. 4,231,963, Cl. 564-443.000.
Shinohara, Hideaki; Kato, Masaru; and Takamatsu, Yoshiaki, to Oji Paper Co., Ltd. Photosensitive lithographic printing plate with hydrophilic sublayer. 4,232,105, Cl. 430-160.000.
Shinohara, Masayoshi: *See—*
Hattori, Seizi; Makino, Koichi; Nakagawa, Takehiko; and Shinohara, Masayoshi, 4,232,061, Cl. 427-130.000.
Shinohara, Toshio: *See—*
Sogi, Shinroku; Yoshinaga, Makoto; Shinohara, Toshio; Aihara, Takayuki; and Tawara, Ikuo, 4,231,403, Cl. 141-284.000.
Shinozaki, Sohji; and Takei, Yoshiaki, to Konishiroku Photo Industry Co., Ltd. Substrates for use in screen photosensitive element. 4,232,104, Cl. 430-68.000.
Shioi, Ryoichi; and Yamauchi, Tamotu, to TDK Electronics Company Limited. PTC Honeycomb heating element with multiple electrode layers. 4,232,214, Cl. 219-541.000.
Shionogi & Co., Ltd.: *See—*
Hirai, Kentaro; Fujishita, Toshio; and Ishiba, Teruyuki, 4,231,930, Cl. 260-245.500.
Nagata, Wataru; Hamashima, Yoshio; Tsuji, Teruji; and Lunn, William H. W., 4,232,151, Cl. 544-90.000.
Shishido, Tadao: *See—*
Adachi, Keiichi; Shishido, Tadao; and Mitsui, Akio, 4,232,114, Cl. 430-504.000.
Shoher, Itzhak; and Whiteman, Aharon E. Dental restorative structures. 4,231,740, Cl. 433-208.000.
Showa Denki K.K.: *See—*
Fujiu, Masayoshi; and Hida, Tetsuo, 4,231,303, Cl. 110-245.000.
Shulman, Joseph: *See—*
Raphael, Thomas; and Shulman, Joseph, 4,232,079, Cl. 428-195.000.
Shurtz, Melvin D.: *See—*
Huiatt, Jerry L.; Shurtz, Melvin D.; and Potter, George M., 4,231,859, Cl. 209-11.000.
Sides, Jerry L.: *See—*
Carter, Walter H.; and Sides, Jerry L., 4,231,426, Cl. 166-252.000.
Sie, Swan T.: *See—*
Schaper, Lambert; and Sie, Swan T., 4,232,178, Cl. 585-408.000.
Siegel, John R. Vertical belt sanding apparatus. 4,231,193, Cl. 51-141.000.
Siegmund, Walter P., to American Optical Corporation. Method of making ommateal lenses and plates. 4,231,775, Cl. 65-30.00E.
Siemens Aktiengesellschaft: *See—*
Becker, Friedbert; Biethan, Gunter; and Kloeber, Peter, 4,232,318, Cl. 370-29.000.
Brabetz, Bernhard; and Hackl, Helmut, 4,231,692, Cl. 408-230.000.
Finkenzeller, Johann; Holzermer, Guenter; and Wenzek, Gerhard, 4,232,227, Cl. 250-468.000.
Giersberg, Dieter, 4,232,188, Cl. 370-24.000.
Hudek, Karl; and Weigert, Kurt, 4,231,374, Cl. 128-702.000.
Huettner, Robert; Kuetterer, Gerhard; and Sklebitz, Hartmut, 4,232,226, Cl. 250-445.00T.
Jantsch, Ottomar; and Tihanyi, Jeno, 4,231,810, Cl. 148-1.500.
Papp, Alfred; and Harms, Hauke, 4,232,264, Cl. 324-96.000.
Schwierz, Theodor, 4,232,263, Cl. 324-77.00B.
Zeidler, Guenter; and Oestreich, Ulrich, 4,231,635, Cl. 350-96.230.
Zoeke, Siegfried, 4,231,658, Cl. 355-110.000.
Siemens, Richard E.: *See—*
Moser, Kenneth W.; Siemens, Richard E.; and Rhoads, Stanley C., 4,231,866, Cl. 210-660.000.
Siemer, Sidney R.; Gordon, Richard S.; and Nickell, Louis G., to W. R. Grace & Co. Ripening of grapes. 4,231,788, Cl. 71-113.000.
Sierra Labs, Inc.: *See—*
Zuckerman, Matthew M., 4,231,249, Cl. 73-23.000.
Silverstein, Seth D.: *See—*
Vakil, Himanshu B.; and Silverstein, Seth D., 4,232,360, Cl. 362-294.000.
Silverstein, Spencer J.: *See—*
Kurtz, Robert J.; and Silverstein, Spencer J., 4,231,354, Cl. 128-1.00D.
Simon, Martin J., to PPG Industries, Inc. Sealerless primers. 4,232,090, Cl. 428-424.400.
Simonov, Nikolai F.: *See—*
Kuznetsov, Vyacheslav D.; Preobrazhensky, Boris P.; Rozhnov, Valentin E.; Stepanov, Jury V.; Belitsky, Anatoly N.; Beizer, Viktor N.; Tokar, Grigory A.; Plastovets, Ivan K.; Barylo, Ivan I.; Koval, Boris A.; Chepurnykh, Sergei F.; Chumachenko, Petr N.; Simonov, Nikolai F.; Kharkhardin, Petr P.; and Litmanovich, Ilya M., 4,231,860, Cl. 209-169.000.
Singer Company, The: *See—*
Eisenberg, Robert M., 4,232,299, Cl. 340-171.00R.
Sisa, Incorporated: *See—*
Razdan, Raj K.; and Ghosh, Anil C., 4,232,028, Cl. 424-260.000.
Siuta, Gerald J.; Conrow, Ransom B.; Poletto, John F.; and Bernstein, Seymour, to American Cyanamid Company. Ureylene phenylene anionic naphthalenesulfonic acids. 4,231,958, Cl. 260-507.00R.
Skala, Stephen F. Multiplexing for facsimile systems. 4,232,342, Cl. 358-296.000.
SKF Industrial Trading and Development Company B.V.: *See—*
Rhodes, Cyril E.; and Verburgh, Martin B., 4,232,094, Cl. 428-614.000.
Sklebitz, Hartmut: *See—*
Huettner, Robert; Kuetterer, Gerhard; and Sklebitz, Hartmut, 4,232,226, Cl. 250-445.00T.
Slavin, Michael; and Telmet, Juhan, to Lectron Products, Inc. Tone generator. 4,232,287, Cl. 340-52.00E.
SMC Corporation: *See—*
Snyder, John L., 4,231,815, Cl. 148-24.000.
Smelter Control Research Association, Inc.: *See—*
Campbell, Ivor E.; Henderson, James M.; Johnson, Walter; and Wetherill, William H., 4,231,995, Cl. 423-242.000.
Smiley, Charles F.; and Zachum, Billy G., to Harris Corporation. Television signal horizontal interval timing reconstruction system. 4,232,339, Cl. 358-150.000.
Smiley, Parker C., to Physics International Company. Spring diaphragm. 4,231,287, Cl. 92-94.000.
Smirnov, Vladimir A. Device for measuring intensity of magnetic or electromagnetic fields using strain gauges mounted on ferromagnetic plates. 4,232,265, Cl. 324-260.000.
Smith, Alan C.; and Runkel, Manfred A., to Textron, Inc. Load equilization feedback for parallel channel servo actuators. 4,231,284, Cl. 91-171.000.
Smith, Barbara J.: *See—*
Still, Robert C.; Huppenthal, Frank J.; Smith, Barbara J.; and Scotney, Gerald H., 4,231,389, Cl. 137-315.000.
Smith, Dennis W.; and Mazzacano, Paul J., to F F Fabricators, Inc. Collapsible traffic barricade. 4,231,676, Cl. 404-6.000.

Smith, George H.; and Olofson, Peter M., to Minnesota Mining and Manufacturing Company. Complex salt photoinitiator. 4,231,951, Cl. 260-446.000.
Smith, Henry E., to Xerox Corporation. Clip for attaching guide rails to a frame. 4,231,674, Cl. 403-233.000.
Smith International, Inc.: *See*—
Garner, Lloyd L.; and Harris, Charles R., 4,231,438, Cl. 175-353.000.
Smith, Lawrence A., Jr., to Chemical Research & Licensing Company. Catalytic distillation process. 4,232,177, Cl. 585-324.000.
Smith, Peter. Hanger with collapsible arms provided with a release and locking mechanism. 4,231,499, Cl. 223-94.000.
Smith, Philip N., to Standex International Corporation. In-line package relay. 4,232,281, Cl. 335-152.000.
Smith, William E.; and McGee, Thomas W., to Dow Chemical Company, The. Nitrosation of aromatic compounds. 4,232,175, Cl. 568-706.000.
Smiths Industries Limited: *See*—
Eccles, Edward S.; and Gibson, Harry, 4,232,312, Cl. 340-753.000.
Smyth, Robert W.: *See*—
Hirsch, Horst E.; and Smyth, Robert W., 4,231,981, Cl. 264-102.000.
Snamprogetti S.p.A.: *See*—
Re, Luciano; Brandt, Alberto; and Bassignani, Luciano, 4,232,169, Cl. 560-174.000.
Snoke, Edgar O.: *See*—
Schut, Robert N.; Snoke, Edgar O.; and Van Dyke, John W., Jr., 4,232,160, Cl. 546-146.000.
Snyder, John L., to SMC Corporation. Copper alloy brazing paste. 4,231,815, Cl. 148-24.000.
Snyder, Robert F.: *See*—
Bickford, John H.; and Snyder, Robert F., 4,231,454, Cl. 192-4.00R.
Socapex: *See*—
Badoz, Jean-Marie; and Merceron, Daniel, 4,231,632, Cl. 339-97.00R.
Societa Italiana Telecomunicazioni Siemens S.p.A.: *See*—
Cottatellucci, Ezio, 4,232,387, Cl. 371-47.000.
Societa Pneumatici Pirelli S.p.A.: *See*—
Mezzanotte, Mario, 4,231,409, Cl. 152-354.00R.
Societe Alsacienne de Constructions Mecaniques de Mulhouse: *See*—
Duris, Jean, 4,231,167, Cl. 34-66.000.
S.A. Anarec: *See*—
Jottier, Christian F., 4,231,990, Cl. 422-100.000.
Societe Anonyme de Recherche et d'Etudes Techniques: *See*—
Augier, Robert; Carbonari, Jean P.; and Eliche, Jean, 4,231,198, Cl. 52-91.000.
Societe Anonyme des Usines Chausson: *See*—
Moranne, Jean-Pierre, 4,231,422, Cl. 165-69.000.
Moranne, Jean-Pierre, 4,231,424, Cl. 165-107.00D.
Moranne, Jean-Pierre, 4,231,794, Cl. 75-166.00C.
Societe Anonyme dite: CM Industries: *See*—
Lomard, Jean-Pierre, 4,232,019, Cl. 424-248.560.
S.A. Mainetti: *See*—
Mainetti, Mario, 4,231,500, Cl. 223-96.000.
Societe Nationale d'Etude et de Construction de Moteurs d'Aviation: *See*—
Ayache, Michel R.; Delonge, Jean-Claude L.; and Marey, Daniel J., 4,231,704, Cl. 416-95.000.
Societe Samibem, S.A.: *See*—
Weber, Marcel, 4,231,216, Cl. 56-13.600.
Societe Suisse pour l'Industrie Horlogere Management Services S.A.: *See*—
Jaunin, Jean-Pierre, 4,232,384, Cl. 368-185.000.
Sogi, Shinroku; Yoshinaga, Makoto; Shinohara, Toshio; Aihara, Takayuki; and Tawara, Ikuo, to Olympus Optical Co., Ltd. Liquid feeder for automatic culture apparatus. 4,231,403, Cl. 141-284.000.
Solar Unlimited, Inc.: *See*—
Bowden, Donald R.; and Sparks, Robert O., 4,231,352, Cl. 126-422.000.
Solomin, Vladimir A.: *See*—
Popov, Alexandr D.; and Solomin, Vladimir A., 4,232,237, Cl. 310-13.000.
Solomons, William E.: *See*—
Mathison, Ian W.; and Solomons, William E., 4,232,014, Cl. 424-324.000.
Solvay & Cie.: *See*—
Dechenne, Roger; and Hubert, Guy, 4,231,483, Cl. 220-66.000.
Somekh, Sasson; and Ahlquist, C. Norman, to Intel Corporation. Variable thickness self-aligned photoresist process. 4,231,811, Cl. 148-1.500.
Somet Societa Meccanica Tessile, S.p.A.: *See*—
Merisio, Alberto, 4,231,402, Cl. 139-448.000.
Sommer, Ruediger, to Dr. Ing. Rudolf Hell GmbH. Method and apparatus for recording graphic or image information by means of punctiform recording spots. 4,232,343, Cl. 358-296.000.
Sony Corporation: *See*—
Hanajima, Hidemitsu; and Shigeta, Yasuo, 4,232,267, Cl. 328-138.000.
Kamoto, Hidetoshi, 4,232,371, Cl. 364-561.000.
Mori, Yoshihisa; Mashimo, Norio; and Eguchi, Takeo, 4,232,202, Cl. 179-100.40E.
Ohta, Teruo, 4,232,350, Cl. 360-132.000.
Tachi, Katsuichi, 4,232,347, Cl. 360-73.000.
Takahashi, Kenji, 4,231,474, Cl. 206-387.000.
Toyama, Akira; Ohkoshi, Akio; Toyama, Takashi; Yukawa, Takahiro; and Hosono, Takashi, 4,232,332, Cl. 358-67.000.
Watanabe, Toshiro; and Suzuki, Koji, 4,232,341, Cl. 358-250.000.
Sorensen, Erik L.; and Larsen, Hans-Ole, to Coloplast International A/S. Sealing material for ostomy devices. 4,231,369, Cl. 128-283.000.
Sorensen, Norman L., to Wisco Corporation. Sunroof structure. 4,231,608, Cl. 296-216.000.
Sorensen, Norman L., to Wisco Corporation. Vehicle sunroof frame. 4,231,609, Cl. 296-218.000.
Souriau et Cie: *See*—
Badoz, Jean-Marie; and Merceron, Daniel, 4,231,632, Cl. 339-97.00R.
Southgate, John P.: *See*—
Hill, William F.; and Southgate, John P., 4,232,368, Cl. 364-431.000.
Sparks, Robert O.: *See*—
Bowden, Donald R.; and Sparks, Robert O., 4,231,352, Cl. 126-422.000.
Spectra-Physics, Inc.: *See*—
Studebaker, Robert H., 4,231,700, Cl. 414-700.000.
Sperry Corporation: *See*—
Englund, Robert M., 4,232,365, Cl. 364-200.000.
Speshyock, Fred R. Respiratory control. 4,231,364, Cl. 128-206.150.
Sphere Investments Limited: *See*—
Stone, Alan M., 4,231,478, Cl. 209-576.000.
Spiegler, Kurt S., to United States of America, Interior. Backwashing reverse-osmosis and ultrafiltration membranes by electro-osmosis. 4,231,865, Cl. 210-636.000.
Spina, Vincenzo: *See*—
Riitano, Francesco; and Spina, Vincenzo, 4,231,738, Cl. 433-102.000.
Spott, Georg: *See*—
Schmidt, Manfred; Bandtel, Eberhard; Traudisch, Walter; Spott, Georg; and Freitag, Dieter, 4,232,134, Cl. 525-506.000.
Spranger, Kurt, to Gambro Dialysatoren GmbH & Co. KG. Apparatus for selective separation of matter through semi-permeable membranes. 4,231,879, Cl. 210-321.00B.
Spransy, George B., to Anspack, Inc. Threaded bottle lid. 4,231,480, Cl. 215-329.000.
Sprecker, Mark A.; Schmitt, Frederick L.; Vock, Manfred H.; Vinals, Joaquin F.; and Kiwala, Jacob, to International Flavors & Fragrances Inc. 2-Oxabicyclooctane derivatives. 4,231,940, Cl. 260-345.100.
Spuhl AG: *See*—
Spuhl, Walter, 4,231,723, Cl. 417-429.000.
Spuhl, Walter, to Spuhl AG. Metering and conveyor arrangement. 4,231,723, Cl. 417-429.000.
Spurgin, Wendell P., to United Air Specialists, Inc. Two stage electrostatic precipitator with electric field induced airflow. 4,231,766, Cl. 55-138.000.
Standard Brands Incorporated: *See*—
Pomper, Seymour; and Akerman, Emanuel, 4,232,045, Cl. 426-62.000.
Standard Oil Company (Indiana): *See*—
Adams, Halbert E.; Cooper, Edgar R.; Ford, Lowell D.; Johnson, Delbert C.; and Warren, Gregory L., 4,232,378, Cl. 367-36.000.
Boone, David E., 4,232,138, Cl. 526-122.000.
Kolpak, Miroslav M., 4,231,429, Cl. 166-362.000.
Udelhofen, John H.; and Watson, Roger W., 4,231,759, Cl. 44-75.000.
Waller, Michael R., 4,231,436, Cl. 175-7.000.
Standex International Corporation: *See*—
Smith, Philip N., 4,232,281, Cl. 335-152.000.
Stanley Works, The: *See*—
Amtmann, James S.; and Bobrowski, Louis G., 4,231,626, Cl. 312-350.000.
Starkey Labs, Inc.: *See*—
Beex, Aloysius A., 4,232,192, Cl. 179-1.0FS.
Statz, Robert J.; and Doty, James K., to Du Pont de Nemours, E. I., and Company. Catalyst and dehydrogenation process. 4,232,174, Cl. 562-599.000.
Stauffer Chemical Company: *See*—
Obrecht, Robert P., 4,231,959, Cl. 260-544.00K.
Uhing, Eugene H., 4,231,970, Cl. 260-931.000.
Steag A.G.: *See*—
Meyer-Kahrweg, Helmut, 4,231,761, Cl. 48-192.000.
Stec, Daniel L.: *See*—
Mueller, Rand W.; and Stec, Daniel L., 4,232,354, Cl. 361-172.000.
Stenberg, Kaj O.: *See*—
Carlsson, Per-Olov A. V.; and Stenberg, Kaj O., 4,231,875, Cl. 210-232.000.
Carlsson, Per-Olov A. V.; and Stenberg, Kaj O., 4,231,880, Cl. 210-321.00B.
Stepanov, Jury V.: *See*—
Kuznetsov, Vyacheslav D.; Preobrazhensky, Boris P.; Rozhnov, Valentin E.; Stepanov, Jury V.; Belitsky, Anatoly N.; Beizer, Viktor N.; Tokar, Grigory A.; Plastovets, Ivan K.; Barylo, Ivan I.; Koval, Boris A.; Chepurnykh, Sergei F.; Chumachenko, Petr N.; Simonov, Nikolai F.; Kharkhardin, Petr P.; and Litmanovich, Ilya M., 4,231,860, Cl. 209-169.000.
Sterling Drug Inc.: *See*—
Diana, Guy D.; and Carabateas, Philip M., 4,232,161, Cl. 546-279.000.
Stern, Richard M.: *See*—
Scherrer, Robert A.; and Stern, Richard M., 4,231,965, Cl. 568-327.000.
Stetson, John R.; Graham, Alan A.; and Frisch, Rudolf, to Congoleum Corporation. Methods of obtaining deep through penetration of colorants into polyvinyl chloride compositions, and the resulting products. 4,232,076, Cl. 428-158.000.

Stevens, Joel B.; and Wirfs, Mark C., to Cascade Steel Rolling Mills, Inc. Method and apparatus for dipping metal fence posts. 4,232,066, Cl. 427-430.100.

Stevens, Pierre M. Device for perforating packaged cigarettes. 4,231,378, Cl. 131-170.00R.

Stewart, Robert E.: *See*—
Levy, John V.; Rodgers, David P.; Stewart, Robert E.; and Casabona, Richard J., 4,232,366, Cl. 364-200.000.

Stewart, Robert M.; and Schwartz, Robert W., to W. R. Grace & Co. Prill tower rake. 4,231,227, Cl. 62-57.000.

Stewart, William S., to Phillips Petroleum Company. Control of a cracking furnace. 4,231,753, Cl. 23-230.00A.

Sticht, Walter. Apparatus for separating individual assembly parts from a coherent mass and for orienting the individual parts. 4,231,687, Cl. 406-52.000.

Still, Robert C.; Huppenthal, Frank J.; Smith, Barbara J.; and Scotney, Gerald H., to New Concepts, Inc. Removable operator for gate valves. 4,231,389, Cl. 137-315.000.

Stoelting, Inc.: *See*—
Hinds, Horace, Jr.; Heimerman, David P.; and Born, Billy L., 4,232,051, Cl. 426-582.000.

Stohlquist, Roger H.; and Strombeck, Leo, to Anderson Bros. Mfg. Co. Tension controlled apparatus for feeding web material. 4,231,560, Cl. 493-29.000.

Stoll, Christopher A. Camper anchoring and locking structure. 4,231,610, Cl. 296-167.000.

Stolle, James R., to White Consolidated Industries, Inc. Safety interlock for offset printing press. 4,231,292, Cl. 101-137.000.

Stone, Alan M., to Sphere Investments Limited. Bulk sorting of particulate material. 4,231,478, Cl. 209-576.000.

Strampfer, Armin; and Voegele, Guenther, to Robert Bosch GmbH. Method and apparatus for sealing the fill openings of hard gelatine capsules filled with liquid. 4,231,211, Cl. 53-452.000.

Stratton, Richard W.: *See*—
Bischoff, Klaus; and Stratton, Richard W., 4,231,976, Cl. 264-0.500.

Strecke, Joachim: *See*—
Ponsold, Kurt; Prousa, Richard; Oettel, Michael; Strecke, Joachim; and Hoffmann, Herbert, 4,231,946, Cl. 260-397.400.

Strehlow, Wighard: *See*—
Poetsch, Eike; Uhl, Jurgen; Marx, Dieter; Strehlow, Wighard; Muller-Calgan, Helmut; and Dolce, Giuliano, 4,232,016, Cl. 414-244.000.

Strickland, James K., to Strickland Systems, Inc. Concrete form panel tying apparatus. 4,231,541, Cl. 249-216.000.

Strickland Systems, Inc.: *See*—
Strickland, James K., 4,231,541, Cl. 249-216.000.

Strombeck, Leo: *See*—
Stohlquist, Roger H.; and Strombeck, Leo, 4,231,560, Cl. 493-29.000.

Studebaker, Robert H., to Spectra-Physics, Inc. Method and apparatus for laser beam control of backhoe digging depth. 4,231,700, Cl. 414-700.000.

Sudweeks, Walter B.; and Lawrence, Larry D., to IRECO Chemicals. Emulsion blasting agent sensitized with perlite. 4,231,821, Cl. 149-21.000.

Sugasawa, Fukashi; and Iizuka, Haruhiko, to Nissan Motor Company, Limited. Internal combustion engine. 4,231,338, Cl. 123-568.000.

Sugimoto, Etsuro: *See*—
Chiba, Hideo; Sasaki, Ryuzo; Yoshikawa, Masaaki; Takahashi, Naofumi; Sugimoto, Etsuro; and Samejima, Hirotoshi, 4,232,044, Cl. 426-44.000.

Sugita Sangyo Kabushiki Kaisha: *See*—
Ikeda, Mankichi, 4,231,551, Cl. 254-344.000.

Sugiyama, Keiichi: *See*—
Matsumoto, Hiromitsu; and Sugiyama, Keiichi, 4,231,339, Cl. 123-568.000.

Sullivan, Charles I., to Polaroid Corporation. Novel battery assembly. 4,232,099, Cl. 429-152.000.

Sullivan, Daniel S., III; and Bridges, Wilbur L., to Exxon Research & Engineering Co. Process for preparation of thioethers. 4,231,956, Cl. 260-465.80R.

Sulzer Brothers Limited: *See*—
Mona, Roberto; and Gnieser, Jurgen, 4,231,862, Cl. 210-601.000.

Sulzer Morat GmbH: *See*—
Schmid, Manfred; Elsaber, Martin; and Weik, Manfred, 4,231,234, Cl. 66-27.000.

Sumitomo Chemical Company, Limited: *See*—
Matsuda, Teruo; and Murata, Tetsuo, 4,231,967, Cl. 568-433.000.

Sumitomo Electric Industries, Ltd.: *See*—
Hara, Akio; and Yazu, Shuji, 4,231,762, Cl. 51-309.000.

Summa Corporation: *See*—
Miller, Robert C., 4,232,093, Cl. 428-591.000.

Summa Four, Inc.: *See*—
Boatwright, John T.; Prince, David G.; Haskett, William F.; and Koch, Helmut, 4,232,199, Cl. 179-18.00B.

Suntech, Inc.: *See*—
Seitzer, Walter H.; and Schneider, Abraham, 4,231,858, Cl. 208-89.000.

Sunvic Regler GmbH: *See*—
Roth, Gunther;, 4,231,385, Cl. 137-86.000.

Superfos Emballage: *See*—
Bock, Erik, 4,231,486, Cl. 220-266.000.

Sussman, Milton H., to American Optical Corporation. Seven-component microscope objective. 4,231,637, Cl. 350-175.0ML.

Sutphin, Eldon M. Method and apparatus for treating water. 4,231,863, Cl. 210-615.000.

Sutphin, Eldon M. Method and apparatus for treating heterogeneous fluid systems. 4,231,867, Cl. 210-703.000.

Suzue, Takashi: *See*—
Kajihara, Motoyoshi; Hamakawa, Toshihiro; Shibata, Toshiaki; Suzue, Takashi; and Fujii, Setsuro, 4,232,007, Cl. 424-177.000.

Suzuki, Koji: *See*—
Watanabe, Toshiro; and Suzuki, Koji, 4,232,341, Cl. 358-250.000.

Suzuki, Minoru, to Ricoh Company, Ltd. Sheet feed apparatus. 4,231,566, Cl. 271-117.000.

Suzuki, Suzuo; Nagaishi, Hastuo; and Masaki, Kenji, to Nissan Motor Company, Limited. Pulse generator of the corona discharge type for sensing engine crankshaft angle on an engine control system. 4,231,331, Cl. 123-416.000.

Suzuki, Yasuo: *See*—
Yomogida, Toshihiko; and Suzuki, Yasuo, 4,232,236, Cl. 307-297.000.

Sweeny, Norman P.: *See*—
Buerkley, Donald D.; Sweeny, Norman P.; and Vivona, Daniel N., 4,232,083, Cl. 428-307.000.

Swersky, Gerald S.; and Mason, Keith J., to Christensen, Inc. Combined stabilizer and reamer for drilling well bores. 4,231,437, Cl. 175-325.000.

Swigger, Michael P. Underwater liquid containment system. 4,231,873, Cl. 210-170.000.

Swiss Aluminium Ltd.: *See*—
Pirner, Miroslav; Zoller, Heinrich; and Bichsel, Heinz, 4,232,095, Cl. 428-654.000.

Synek, Jan: *See*—
Hestad, Alfred M.; Synek, Jan; and Hansen, Harold O., 4,232,200, Cl. 179-90.00K.

Syntex (U.S.A.) Inc.: *See*—
Kluge, Arthur F.; and Muchowski, Joseph M., 4,232,038, Cl. 424-274.000.
Waterbury, L. David, 4,232,040, Cl. 424-283.000.

Szailer, Ferenc: *See*—
Kovacsay, Istvan; Szajko nee Lorinczi, Maria; Dubovszky, Istvan; Magdanyi, Laszlo; Szailer, Ferenc; and Szatmari, Ede, 4,232,136, Cl. 525-327.000.

Szajko nee Lorinczi, Maria: *See*—
Kovacsay, Istvan; Szajko nee Lorinczi, Maria; Dubovszky, Istvan; Magdanyi, Laszlo; Szailer, Ferenc; and Szatmari, Ede, 4,232,136, Cl. 525-327.000.

Szala, Lawrence E.: *See*—
DeVries, Robert C.; Lee, Minyoung; Szala, Lawrence E.; and Tuft, Roy E., 4,231,195, Cl. 51-307.000.

Szatmari, Ede: *See*—
Kovacsay, Istvan; Szajko nee Lorinczi, Maria; Dubovszky, Istvan; Magdanyi, Laszlo; Szailer, Ferenc; and Szatmari, Ede, 4,232,136, Cl. 525-327.000.

Tabata, Norikazu: *See*—
Tanaka, Masaaki; Ueno, Takanori; and Tabata, Norikazu, 4,232,229, Cl. 250-541.000.

Tabata, Yasuhiro: *See*—
Kaneko, Tamaki; Miyakawa, Seiichi; Satomi, Toyokazu; Koizumi, Yutaka; Nakamura, Isao; and Tabata, Yasuhiro, 4,231,561, Cl. 271-3.100.

Tabei, Masatoshi; Kawaziri, Kazuhiro; and Nakajima, Yosuke, to Fuji Photo Film Co., Ltd. Thin film photovoltaic cell and a method of manufacturing the same. 4,231,808, Cl. 136-260.000.

Tachi, Katsuichi, to Sony Corporation. Video tape control time code reading. 4,232,347, Cl. 360-73.000.

Tachibana, Hisataro; and Ono, Hiromi, to Kawasaki Jukogyo Kabushiki Kaisha. Water-jet propulsion unit for vessels. 4,231,315, Cl. 440-43.000.

Tadanier, John S.; Martin, Jerry R.; and Kurath, Paul, to Abbott Laboratories. 4-N-Acylfortimicin B derivatives and the chemical conversion of fortimicin B to fortimicin A. 4,231,924, Cl. 260-112.50R.

Tadanier, John S.; and Martin, Jerry R., to Abbott Laboratories. 4-N-Acylfortimicin B-1,5-carbamates. 4,232,147, Cl. 536-4.000.

Tagliaferri, Ermanno: *See*—
Tratta, Bruno G.; and Tagliaferri, Ermanno, 4,231,236, Cl. 68-15.000.

Taguchi, Nobuyoshi; Matsuo, Koji; Takahashi, Hiromu; and Oda, Fujio, to Matsushita Electric Industrial Co., Ltd. Thermal head. 4,232,213, Cl. 219-216.000.

Taiho Pharmaceutical Company Ltd.: *See*—
Kajihara, Motoyoshi; Hamakawa, Toshihiro; Shibata, Toshiaki; Suzue, Takashi; and Fujii, Setsuro, 4,232,007, Cl. 424-177.000.

Taito Co., Ltd.: *See*—
Touyama, Ryousuke; Inouye, Hiroyuki; Shingu, Tetsuro; Takeda, Yoshio; Ikumoto, Takeshi; Okuyama, Hidetoshi; and Yamamoto, Osamu, 4,232,159, Cl. 546-112.000.

Takada, Yoshihiro: *See*—
Ueda, Shinjiro; Takada, Yoshihiro; Mishina, Haruo; and Kuroda, Atsuhiko, 4,231,706, Cl. 416-186.00R.

Takahashi, Hiromu: *See*—
Taguchi, Nobuyoshi; Matsuo, Koji; Takahashi, Hiromu; and Oda, Fujio, 4,232,213, Cl. 219-216.000.

Takahashi, Kenji, to Sony Corporation. Storage case. 4,231,474, Cl. 206-387.000.

Takahashi, Kunio: *See*—
Menju, Shinichi; Takahashi, Kunio; Haginomori, Eiichi; Murakami, Yoichi; and Zaima, Eiichi, 4,231,258, Cl. 73-572.000.

Takahashi, Naofumi: *See*—
Chiba, Hideo; Sasaki, Ryuzo; Yoshikawa, Masaaki; Takahashi, Naofumi; Sugimoto, Etsuro; and Samejima, Hirotoshi, 4,232,044, Cl. 426-44.000.

Takahashi, Ryohei: *See*—
Nishiyama, Ryuzo; Takahashi, Ryohei; Fujikawa, Kanichi; Nasu, Rikuo; and Sakashita, Nobuyuki, 4,231,787, Cl. 71-107.000.

Takahashi, Shigeru: *See*—
Menju, Shinichi; Ohshima, Iwao; and Takahashi, Shigeru, 4,232,352, Cl. 361-120.000.

Takahashi, Yuji: *See*—
Ichikawa, Junji; Takahashi, Yuji; and Saito, Jun, 4,231,565, Cl. 271-105.000.

Takamatsu, Yoshiaki: *See*—
Shinohara, Hideaki; Kato, Masaru; and Takamatsu, Yoshiaki, 4,232,105, Cl. 430-160.000.

Takanashi, Itsuo: *See*—
Motoyama, Koichiro; Takanashi, Itsuo; Miyoshi, Tadayoshi; Nakagaki, Shintaro; Yokokawa, Sumio; and Miyazaki, Kenichi, 4,232,331, Cl. 358-44.000.

Takashima, Hiroaki: *See*—
Kato, Osamu; Uemura, Seiichi; Yamamoto, Syunichi; Hirose, Takao; and Takashima, Hiroaki, 4,231,857, Cl. 208-40.000.

Takazawa, Yuzuru: *See*—
Kitai, Kiyoshi; and Takazawa, Yuzuru, 4,231,647, Cl. 354-195.000.

Takeda, Keiso, to Toyota Kidosha Kogyo Kabushiki Kaisha. Secondary air control system for an internal combustion engine. 4,231,220, Cl. 60-276.000.

Takeda, Yoshio: *See*—
Touyama, Ryousuke; Inouye, Hiroyuki; Shingu, Tetsuro; Takeda, Yoshio; Ikumoto, Takeshi; Okuyama, Hidetoshi; and Yamamoto, Osamu, 4,232,159, Cl. 546-112.000.

Takei, Yoshiaki: *See*—
Shinozaki, Sohji; and Takei, Yoshiaki, 4,232,104, Cl. 430-68.000.

Takematsu, Tetsuo: *See*—
Okii, Mitsuyoshi; Onitake, Tatsuya; Kawai, Masanobu; Takematsu, Tetsuo; and Konnai, Makato, 4,231,789, Cl. 71-121.000.

Takenake, Yoshimichi: *See*—
Fujita, Isao; Onoda, Mamoru; Kawaguchi, Fumikazu; Takenake, Yoshimichi; and Tsutaya, Tadao, 4,231,797, Cl. 75-256.000.

Takenoya, Hideaki, to Janome Sewing Machine Co., Ltd. Pulse generator for sewing machines. 4,231,307, Cl. 112-158.00E.

Takeuchi, Yo; Ohbori, Koichi; Hatsushika, Masabumi; and Komori, Shinichi, to Mitsubishi Kinzoku Kabushiki Kaisha. Extruded corrosion resistant structural aluminum alloy. 4,231,817, Cl. 148-32.500.

Tallman, James L., to Tektronix, Inc. Memory preservation and verification system. 4,232,377, Cl. 365-229.000.

Tanaka, Gentaro: *See*—
Kishino, Takao; and Tanaka, Gentaro, 4,232,251, Cl. 315-167.000.

Tanaka, Masaaki; Ueno, Takanori; and Tabata, Norikazu, to Mitsubishi Denki Kabushiki Kaisha. Ozonizer. 4,232,229, Cl. 250-541.000.

Tanaka, Taku: *See*—
Yamauchi, Kazuhisa; Tanaka, Taku; Kawai, Syuji; and Tanii, Hirokuni, 4,231,877, Cl. 210-321.00B.

Tanii, Hirokuni: *See*—
Yamauchi, Kazuhisa; Tanaka, Taku; Kawai, Syuji; and Tanii, Hirokuni, 4,231,877, Cl. 210-321.00B.

Tapley, David R., to Clark Equipment Company. Control system for a storage/retrieval machine in an automated material handling system. 4,232,370, Cl. 364-478.000.

Taplin, David; Weinstein, Marvin J.; Testa, Raymond T.; Marquez, Joseph A.; and Patel, Mahesh G., to Schering Corporation. Antibiotic W-10 complex, antibiotic 20561 and antibiotic 20562 as antifungal agents. 4,232,006, Cl. 424-177.000.

Tate, Clarence R., to Thalatta, Inc. Sheets containing microencapsulated color-coded micromagnets. 4,232,084, Cl. 428-309.000.

Tawara, Ikuo: *See*—
Sogi, Shinroku; Yoshinaga, Makoto; Shinohara, Toshio; Aihara, Takayuki; and Tawara, Ikuo, 4,231,403, Cl. 141-284.000.

Taylor, Eugene R., Jr.: *See*—
Eggleston, Philip W.; and Taylor, Eugene R., Jr., 4,231,546, Cl. 251-173.000.

Taylor, Gary N., to Bell Telephone Laboratories, Incorporated. Solid state devices formed by differential plasma etching of resists. 4,232,110, Cl. 430-313.000.

TDK Electronics Company Limited: *See*—
Osawa, Masayuki; and Sekine, Masaoki, 4,231,987, Cl. 264-328.100.
Shioi, Ryoichi; and Yamauchi, Tamotu, 4,232,214, Cl. 219-541.000.

Teague, Kenneth W., to Chrysler Corporation. Pressure regulator system. 4,231,390, Cl. 137-315.000.

Tecumseh Products Company: *See*—
Kaufman, Vernon R., 4,231,623, Cl. 308-23.000.

Teichmann, Joachim. Magnetic reciprocating pump for pumping fluids. 4,231,722. Cl. 417-418.000.

Tektronix, Inc.: *See*—
Richards, Mark A., 4,232,250, Cl. 315-13.0ST.
Tallman, James L., 4,232,377, Cl. 365-229.000.

Telesio, George O. Mechanical interfaces for control linkages in a removable vehicle engine module. 4,231,444, Cl. 180-294.000.

Telesio, George O. Transfer of quick-disconnect engine modules from vehicles. 4,231,708, Cl. 414-343.000.

Telex Computer Products, Inc.: *See*—
Brooks, Forrest E., 4,231,150, Cl. 29-593.000.
Kirby, Robert E., 4,231,629, Cl. 339-17.00M.

Telmet, Juhan: *See*—
Slavin, Michael; and Telmet, Juhan, 4,232,287, Cl. 340-52.00E.

ten Broeke, Jan, to Merck & Co., Inc. Diazaditwistanes, and pharmaceutical compositions for treating pain in warm blooded animals containing them. 4,232,026, Cl. 424-258.000.

Terada, Akira; Hattori, Seizi; Ishii, Yoshikazu; Nohara, Akira; Inagaki, Nobuo; Matsuda, Wakatake; and Kawakami, Susumu, to Nippon Telegraph and Telephone Public Corporation; and Fujitsu Limited. Method of producing magnetic thin film. 4,232,071, Cl. 428-64.000.

Teramachi, Hiroshi. Sliding roller bearing with height adjustor. 4,231,621, Cl. 308-6.00C.

te Riele, Johannes H., to Remia B.V. Method of, and apparatus for, regulating the pressure in a deformable conduit conducting a flowing fluid. 4,231,397, Cl. 137-614.110.

Terpstra, Daniel A.: *See*—
Blachly, Donald L.; and Terpstra, Daniel A., 4,231,557, Cl. 269-139.000.

Tesserax Inc.: *See*—
Weiss, Thomas R.; and Kennedy, Matthew R., 4,231,446, Cl. 181-148.000.

Tessier, Jean: *See*—
Martel, Jacques; Tessier, Jean; and Demoute, Jean-Pierre, 4,231,932, Cl. 260-326.00A.

Testa, Raymond T.: *See*—
Taplin, David; Weinstein, Marvin J.; Testa, Raymond T.; Marquez, Joseph A.; and Patel, Mahesh G., 4,232,006, Cl. 424-177.000.

Teutsch, Jean G.; and Deraedt, Roger, to Roussel Uclaf. Novel Δ^4-androstenes. 4,232,015, Cl. 424-243.000.

Texaco Inc.: *See*—
Carter, Walter H.; and Sides, Jerry L., 4,231,426, Cl. 166-252.000.
Kablaoui, Mahmoud S., 4,231,758, Cl. 44-71.000.
Kalfoglou, George, 4,231,427, Cl. 166-275.000.
Koniz, Leon F.; and Estes, John H., 4,231,751, Cl. 23-230.00R.
Sequeira, Avilino, Jr.; and Barger, Frank L., 4,231,459, Cl. 196-46.000.

Texas Alkyls, Inc.: *See*—
Malpass, Dennis B., 4,231,896, Cl. 252-431.00R.

Texas Instruments Incorporated: *See*—
Chapman, Richard A.; Buss, Dennis D.; and Kinch, Michael A., 4,231,149, Cl. 29-578.000.

Textron, Inc.: *See*—
Moertel, George B., 4,231,138, Cl. 24-205.16R.
Smith, Alan C.; and Runkel, Manfred A., 4,231,284, Cl. 91-171.000.

Thalatta, Inc.: *See*—
Tate, Clarence R., 4,232,084, Cl. 428-309.000.

Thatcher, Arthur K.; and McCarter, Ed R., to Thatcher, Arthur K. Single point fuel dispersion system using a low profile carburetor. 4,231,333, Cl. 123-440.000.

Theriot, Joseph E. Adaptive washer and bolt assembly. 4,231,279, Cl. 85-9.00R.

Thijssen, Nicolaas J.: *See*—
Vander, Timen; Thijssen, Nicolaas J.; de Blok, Jan F.; and Middel, Jan, 4,231,845, Cl. 202-113.000.

Thirion, Andre, to Antivols Simplex. Pin tumbler locks and their assembly. 4,231,243, Cl. 70-364.00A.

Thiruvengadam, Alagu P.; and Hochrein, Ambrose A., Jr. Method and apparatus for non-destructive evaluation utilizing the internal friction damping (IFD) technique. 4,231,259, Cl. 73-584.000.

Thoma, Hans A., to Chandon Investment Planning Ltd. Multichannel system for the handling of immobilized biologically active substances. 4,231,989, Cl. 422-63.000.

Thomas, Charles P.: *See*—
Needham, Riley B.; Thomas, Charles P.; and Wier, Donald R., 4,231,428, Cl. 166-280.000.

Thomas, Clifford F. Residential fence. 4,231,552, Cl. 256-24.000.

Thomas, Dennis A.: *See*—
Mroz, Judith C.; and Thomas, Dennis A., 4,231,370, Cl. 128-287.000.

Thomas, Wendl; Doyle, Holly T.; and Doyle, Robert O. Electrical game apparatus using fold switch matrices. 4,231,577, Cl. 273-238.000.

Thompson, Dorman N., Jr.: *See*—
Ramey, Joseph F.; Seiler, George A.; and Thompson, Dorman N., Jr., 4,231,837, Cl. 156-522.000.

Thompson, Earl C. Protective holder for sheet material. 4,231,174, Cl. 40-10.00A.

Thompson, George J., to Dresser Industries, Inc. Lower and crawler frame construction for crawler propelled machines. 4,231,699, Cl. 414-687.000.

Thompson, Morice W.: *See*—
Bentley, John; and Thompson, Morice W., 4,232,135, Cl. 525-509.000.

Thomsen, Peter: *See*—
Mathner, Manfred; and Thomsen, Peter, 4,231,221, Cl. 60-319.000.

Thomson-Brandt: *See*—
Ribeyre, Rene, 4,232,205, Cl. 179-146.00R.

Thomson-CSF: *See*—
Narbaits-Jaureguy, Jean-Raymond; Billottet, Henri; and Granier, Pierre, 4,232,285, Cl. 340-38.00L.

Thornton, William S. Tennis ball target. 4,231,572, Cl. 273-29.00A.

Thyssen Industrie AG: *See*—
Oppenlander, Harry; and Wilde, Ulrich, 4,231,684, Cl. 405-291.000.

Tidue S.r.l.: *See*—
Tratta, Bruno G.; and Tagliaferri, Ermanno, 4,231,236, Cl. 68-15.000.

Tieben, James, to My-D-Han-D Manufacturing Co. Remotely controlled gate opener. 4,231,190, Cl. 49-25.000.

Tieman, Charles H.: *See—*
Sanborn, James R.; and Tieman, Charles H., 4,232,025, Cl. 424-256.000.
Tihanyi, Jeno: *See—*
Jantsch, Ottomar; and Tihanyi, Jeno, 4,231,810, Cl. 148-1.500.
Timron, Inc.: *See—*
Kessler, Theodore P., 4,231,475, Cl. 206-389.000.
Tinoco, Edward N.: *See—*
Ishimitsu, Kichio K.; and Tinoco, Edward N., 4,231,536, Cl. 244-135.00A.
Tite, David J.: *See—*
Whitehead, Alan G.; and Tite, David J., 4,231,306, Cl. 111-86.000.
Tittl, Joseph F. Beach towel for use with a pillow. 4,231,125, Cl. 5-419.000.
Tobita, Hideyuki; and Mori, Toshio, to Hitachi, Ltd. Automatic washing machine and method for operating the same. 4,231,130, Cl. 8-159.000.
Toho Beslon Co., Ltd.: *See—*
Toyama, Takashi; and Kogo, Yasuo, 4,231,169, Cl. 36-43.000.
Tohoku Mikuni Kogyo Co., ltd.: *See—*
Kubota, Kenichi; Mukai, Osamu; and Kariyama, Kenji, 4,231.716, Cl. 417-315.000.
Tokar, Grigory A.: *See—*
Kuznetsov, Vyacheslav D.; Preobrazhensky, Boris P.; Rozhnov, Valentin E.; Stepanov, Jury V.; Belitsky, Anatoly N.; Beizer, Viktor N.; Tokar, Grigory A.; Plastovets, Ivan K.; Barylo, Ivan I.; Koval, Boris A.; Chepurnykh, Sergei F.; Chumachenko, Petr N.; Simonov, Nikolai F.; Kharkhardin, Petr P.; and Litmanovich, Ilya M., 4,231,860, Cl. 209-169.000.
Tokorozawa, Sadao; Shimizu, Toyoji; and Yoshizawa, Naomi, to Pilot Man-Nen-Hitsu Kabushiki Kaisha. Fluid supplying device. 4,231,707, Cl. 417-12.000.
Tokudome, Katumi; Ishikawa, Michio; and Hattori, Shuzo, to Kimmon Electric Co., Ltd. Metal vapor laser system. 4,232,274, Cl. 331-94.50S.
Tokunaga, Michio: *See—*
Okuhara, Shinzi; Ohhinata, Ichiro; and Tokunaga, Michio, 4,232,234, Cl. 307-252.00G.
Tokunaga, Yukio: *See—*
Shinohara, Akira; Wada, Nobuhide; Tokunaga, Yukio; and Yazawa, Chihiro, 4,231,963, Cl. 564-443.000.
Tokyo Denryoku Kabushiki Kaisha: *See—*
Menju, Shinichi; Takahashi, Kunio; Haginomori, Eiichi; Murakami, Yoichi; and Zaima, Eiichi, 4,231,258, Cl. 73-572.000.
Tokyo Eizai Lab. Co., Ltd.: *See—*
Usukura, Koji, 4,231,356, Cl. 128-90.000.
Tokyo Shibaura Denki Kabushiki Kaisha: *See—*
Chaki, Eiichi; Chiba, Taneaki; and Sato, Tetsuo, 4,232,316, Cl. 343-108.00R.
Fukushima, Shigeki; and Ohashi, Tadahiro, 4,232,369, Cl. 364-476.000.
Menju, Shinichi; Takahashi, Kunio; Haginomori, Eiichi; Murakami, Yoichi; and Zaima, Eiichi, 4,231,258, Cl. 73-572.000.
Menju, Shinichi; Ohshima, Iwao; and Takahashi, Shigeru, 4,232,352, Cl. 361-120.000.
Tokyo Shibaura Electric Co., Ltd.: *See—*
Oida, Yoshio; Sasaki, Masayuki; and Semi, Hidetoshi, 4,232,210, Cl. 219-10.55C.
Tomy Kogyo Co., Inc.: *See—*
Kurita, Toshiaki, 4,231,182, Cl. 46-212.000.
Watanabe, Hiroyuki, 4,231,571, Cl. 273-1.00E.
Tooyama, Eiji, to Hitachi, Ltd. Signal transmission control system. 4,232,206, Cl. 179-175.30S.
Toray Industries, Inc.: *See—*
Okamoto, Miyoshi, 4,232,073, Cl. 428-91.000.
Tosco Corporation: *See—*
Gutierrez, Manuel M., 4,231,998, Cl. 423-449.000.
Totsu, Katsuyuki. Electrically driven fastening appliance. 4,231,270, Cl. 81-474.000.
Touyama, Ryousuke; Inouye, Hiroyuki; Shingu, Tetsuro; Takeda, Yoshio; Ikumoto, Takeshi; Okuyama, Hidetoshi; and Yamamoto, Osamu, to Taito Co., Ltd. Nitrogen-containing monoterpene derivatives. 4,232,159, Cl. 546-112.000.
Towmotor Corporation: *See—*
Natale, Anthony J., Jr., 4,231,598, Cl. 292-210.000.
Toyama, Akira; Ohkoshi, Akio; Toyama, Takashi; Yukawa, Takahiro; and Hosono, Takashi, to Sony Corporation. Color television receiver. 4,232,332, Cl. 358-67.000.
Toyama, Takashi; and Kogo, Yasuo, to Toho Beslon Co., Ltd. Insole and method of producing the same. 4,231,169, Cl. 36-43.000.
Toyama, Takashi: *See—*
Toyama, Akira; Ohkoshi, Akio; Toyama, Takashi; Yukawa, Takahiro; and Hosono, Takashi, 4,232,332, Cl. 358-67.000.
Toyo Engineering Corporation: *See—*
Konoki, Keizo; Nobue, Michio; Fukui, Akito; and Inoue, Shigeru, 4,231,961, Cl. 564-65.000.
Toyo Seikan Kaisha, Ltd.: *See—*
Mori, Fumio; Ichinose, Isao; and Kunimoto, Go, 4,232,086, Cl. 428-341.000.
Toyoda-Koki Kabushiki-Kaisha: *See—*
Yomogida, Toshihiko; and Suzuki, Yasuo, 4,232,236, Cl. 307-297.000.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Ishida, Yasuhiko, 4,231,329, Cl. 123-52.0MB.
Kuramoto, Akio; and Onishi, Toshinari, 4,231,341, Cl. 123-552.000.
Nishikawa, Kazuyoshi; Uno, Makoto; and Koga, Hideaki, 4,231,266, Cl. 74-467.000.
Onishi, Sigeru, 4,231,717, Cl. 417-364.000.
Yuuki, Kiyoshi, 4,231,336, Cl. 123-568.000.
Toyota Kidosha Kogyo Kabushiki Kaisha: *See—*
Takeda, Keiso, 4,231,220, Cl. 60-276.000.
Traber, Walter: *See—*
Boger, Manfred; Drabek, Jozef; Mattern, Gunter; and Traber, Walter, 4,232,011, Cl. 424-200.000.
Trane Company, The: *See—*
Ring, H. Kenneth, Jr., 4,231,515, Cl. 236-87.000.
Trask, Elwood G., to Albany International Corp. Method of coating organic fibers with polytetrafluoroethylene. 4,232,087, Cl. 428-389.000.
Tratta, Bruno G.; and Tagliaferri, Ermanno, to Tidue S.r.l. Dyeing machine, particularly for dyeing and drying stocking articles and like garments. 4,231,236, Cl. 68-15.000.
Traub, Henry A., to W. S. Shamban & Co. Seal assembly. 4,231,578, Cl. 277-121.000.
Traudisch, Walter: *See—*
Schmidt, Manfred; Bandtel, Eberhard; Traudisch, Walter; Spott, Georg; and Freitag, Dieter, 4,232,134, Cl. 525-506.000.
Trejo Gonzalez, Humberto. Process to manufacture tubular articles resembling wood, cane, bamboo, reed, wicker, rattan, rush, and the like. 4,231,834, Cl. 156-294.000.
Trio Kabushiki Kaisha: *See—*
Matsuzuka, Takeshi, 4,232,191, Cl. 179-1.0GD.
Trojer, Felix; and Briggs, John, to Battelle Memorial Institute. Method for manufacturing a panel of anisotropic ceramic glass. 4,231,776, Cl. 65-33.000.
Troy, J. Harold: *See—*
Haderer, Norman G.; and Troy, J. Harold, 4,231,151, Cl. 29-605.000.
TRW Inc.: *See—*
Acker, Roy M., 4,231,767, Cl. 55-186.000.
Inouye, George T.; Sanders, Nathaniel L.; and Moss, Winston C., 4,232,070, Cl. 428-49.000.
Lui, Kenneth, 4,231,847, Cl. 204-7.000.
McDonald, John C.; Baichtal, James R.; and Ling, Alexander C., 4,232,386, Cl. 370-68.000.
Tsao, Sherman H., to International Business Machines Corporation. Apparatus for arranging scanning heads for interlacing. 4,232,324, Cl. 346-75.000.
Tsou, Ivan H., to Grow Group Inc. Cathodic electrodeposition compositions employing fatty acid derivatives. 4,231,907, Cl. 260-23.0AR.
Tsubata, Noritaka, to Yoshida Kogyo K.K. Woven stringer for slide fasteners. 4,231,139, Cl. 24-205.16R.
Tsuboi, Hikotada: *See—*
Oba, Masayuki; Kawamata, Motoo; Tsuboi, Hikotada; and Koga, Nobuhito, 4,231,934, Cl. 260-326.5FM.
Tsuchiya, Yutaka: *See—*
Hiruma, Teruo; and Tsuchiya, Yutaka, 4,232,333, Cl. 358-93.000.
Tsuji, Teruji: *See—*
Nagata, Wataru; Hamashima, Yoshio; Tsuji, Teruji; and Lunn, William H. W., 4,232,151, Cl. 544-90.000.
Tsukada, Toshihisa: *See—*
Yamamoto, Hideaki; Tsukada, Toshihisa; Maruyama, Eiichi; and Inagaki, Hiroya, 4,232,219, Cl. 250-227.000.
Tsukamoto, Goro; Yoshino, Koichiro; Morita, Tominori; Nose, Takashi; and Okazaki, Mitsuo, to Kanebo, Ltd. Calcium-antagonistic composition. 4,232,010, Cl. 424-200.000.
Tsunefuji, Katsuhiko; and Kondo, Isao, to Olympus Optical Co., Ltd. Electrical shutter for camera. 4,231,644, Cl. 354-51.000.
Tsunekawa, Masaru: *See—*
Ohumi, Takeharu; and Tsunekawa, Masaru, 4,231,347, Cl. 123-512.000.
Tsuruoka, Tomio, to Nippon Kogaku K.K. Camera body. 4,231,651, Cl. 354-288.000.
Tsutaya, Tadao: *See—*
Fujita, Isao; Onoda, Mamoru; Kawaguchi, Fumikazu; Takenake, Yoshimichi; and Tsutaya, Tadao, 4,231,797, Cl. 75-256.000.
Tucker, Dempsey G. Coal-gathering assembly for a continuous miner. 4,231,468, Cl. 198-515.000.
Tucker, Terry D.: *See—*
Hannie, Steven G.; and Tucker, Terry D., 4,231,861, Cl. 209-240.000.
Tuerk, Robert P. Pickup truck stake arrangement. 4,231,606, Cl. 296-43.000.
Tuft, Roy E.: *See—*
DeVries, Robert C.; Lee, Minyoung; Szala, Lawrence E.; and Tuft, Roy E., 4,231,195, Cl. 51-307.000.
Tulis, Allen J.: *See—*
Dahn, C. James; Morita, Douglas R.; and Tulis, Allen J., 4,231,293, Cl. 102-7.200.
Tundermann, John H.; and Goodrich, Charles B., to Huntington Alloys Inc. Powder rolling apparatus. 4,231,729, Cl. 425-79.000.
Turk, Chester F.; and Krapcho, John, to E. R. Squibb & Sons, Inc. 1,2-Dihydro-2-oxo-4-phenyl-3-quinolinecarbonitrile derivatives. 4,232,027, Cl. 424-258.000.
Turloff, Harry E. Level indicating and elevation indicating device. 4,231,163, Cl. 33-367.000.
Tuskos, Michael E. Drapery clamping device. 4,231,157, Cl. 33-18.00R.
Tuson, Samuel, to Entreprise d'Equipements Mecaniques et Hydrauliques E.M.H. Structure for sea-bed exploitation allowing the various functions inherent in such exploitation to be performed. 4,231,681, Cl. 405-195.000.

Tuson, Samuel, to Entreprise d'Equipements Mecaniques et Hydrauliques E.M.H. Device for handling appliances on a sea bed. 4,231,682, Cl. 405-202.000.

U-Change Lock Industries, Inc.: *See—*
Hill, Lewis J.; and Dillard, Bill J., 4,231,242, Cl. 70-347.000.

Uchida, Kenji: *See—*
Sakamoto, Masakatsu; Uchida, Kenji; and Kamino, Yukishige, 4,231,686, Cl. 406-14.000.

Uddeholms Aktiebolag: *See—*
Franzen, Olof K.; Hallstrom, Ulf; and Petersson, Bengt A., 4,232,096, Cl. 428-683.000.

Udelhofen, John H.; and Watson, Roger W., to Standard Oil Company (Indiana). Liquid hydrocarbon fuels containing high molecular weight Mannich bases. 4,231,759, Cl. 44-75.000.

Ueda, Shinjiro; Takada, Yoshihiro; Mishina, Haruo; and Kuroda, Atsuhiko, to Hitachi, Ltd. Impeller of a centrifugal blower. 4,231,706, Cl. 416-186.00R.

Uede, Hisashi: *See—*
Funada, Fumiaki; Nonomura, Keisaku; Uede, Hisashi; and Wada, Tomio, 4,231,640, Cl. 350-336.000.

Uemura, Seiichi: *See—*
Kato, Osamu; Uemura, Seiichi; Yamamoto, Syunichi; Hirose, Takao; and Takashima, Hiroaki, 4,231,857, Cl. 208-40.000.

Ueno, Takanori: *See—*
Tanaka, Masaaki; Ueno, Takanori; and Tabata, Norikazu, 4,232,229, Cl. 250-541.000.

Uhing, Eugene H., to Stauffer Chemical Company. Reaction products of unsaturated hydrocarbons with P_4S_{10} and PSX_3. 4,231,970, Cl. 260-931.000.

Uhl, Jurgen: *See—*
Poetsch, Eike; Uhl, Jurgen; Marx, Dieter; Strehlow, Wighard; Muller-Calgan, Helmut; and Dolce, Giuliano, 4,232,016, Cl. 414-244.000.

Uhlemayr, Albert: *See—*
Clausen, Dieter; and Uhlemayr, Albert, 4,231,742, Cl. 8-470.000.

Uhrbom, Lars E.: *See—*
Magnusson, Ulf S. G.; and Uhrbom, Lars E., 4,232,100, Cl. 429-217.000.

Umino, Naozi: *See—*
Nakagawa, Eishiro; Miyamoto, Taketoshi; Umino, Naozi; and Oyama, Hirosi, 4,231,146, Cl. 29-432.000.

Umtech, Inc.: *See—*
Chung, David H.; and Cosley, John V., 4,232,374, Cl. 364-900.000.

Unaform, Inc.: *See—*
Matuska, Tibor L., 4,231,401, Cl. 139-383.00A.

Uni-Cardan Aktiengesellschaft: *See—*
Krude, Werner, 4,231,233, Cl. 64-21.000.

UNICEM-Unione Cementerie Marchino, Emiliane e di Augusta S.p.A.: *See—*
Raiteri, Angelo, 4,231,212, Cl. 53-459.000.

Unigovsky, Mikhail R.; Rulevsky, Evgeny V.; Sapa, Fedor I.; Parkhomchuk, Alexei T.; Yampolsky, Arnold S.; Rotenfeld, Veniamin S.; Ivanov, Vasily T.; Nemirovsky, Isaak Y.; Kovalenko, Viktor M.; and Vnuchenko, Nikolai S. Apparatus for removing a welding bulge from pipes. 4,231,694, Cl. 409-179.000.

Union Carbide Corporation: *See—*
Denny, Arthur F.; and Sherman, John D., 4,231,887, Cl. 252-174.190.
D'Silva, Themistocles D. J., 4,232,035, Cl. 424-270.000.
Grant, Andrew C.; and Kern, James W., 4,232,056, Cl. 427-37.000.
Robeson, Lloyd M., 4,231,922, Cl. 260-45.95G.

United Air Specialists, Inc.: *See—*
Spurgin, Wendell P., 4,231,766, Cl. 55-138.000.

United Kingdom Atomic Energy Authority: *See—*
Woodhead, James L., 4,231,893, Cl. 252-313.00R.

United National Bank & Trust Co., executor: *See—*
Boll, Richard H., deceased; and Ghering, Walter L., 4,231,262, Cl. 73-861.040.

United Networks, Inc.: *See—*
Hestad, Alfred M.; Synek, Jan; and Hansen, Harold O., 4,232,200, Cl. 179-90.00K.

U.S. Armament Corporation: *See—*
Foote, John P., 4,231,177, Cl. 42-16.000.

United States Gypsum Company: *See—*
Wendt, Alan C., 4,231,205, Cl. 52-481.000.

United States of America
Agriculture: *See—*
Koenig, Nathan H.; and Friedman, Mendel, 4,231,747, Cl. 8-127.600.
Air Force: *See—*
Dahn, C. James; Morita, Douglas R.; and Tulis, Allen J., 4,231,293, Cl. 102-7.200.
Durig, Richard F., 4,231,533, Cl. 244-3.160.
Gawronski, Michael J.; and Goldie, Harry, 4,232,278, Cl. 333-13.000.
Lintell, Robert J.; and Campbell, James D., 4,231,534, Cl. 244-3.160.
Millea, Michael F.; and Seib, David H., 4,232,221, Cl. 250-311.000.
O'Connell, Robert M., 4,232,240, Cl. 310-313.00A.
Rolinski, Edmund J.; and Laub, Bernard, 4,231,248, Cl. 73-15.600.
America: *See—*
Shealy, Y. Fulmer; and O'Dell, C. Allen, 4,232,154, Cl. 544-250.000.
Army: *See—*
Chang, Yu-Wen; and Paul, Jeffrey A., 4,232,401, Cl. 455-328.000.
Dickens, Lawrence E.; and Maki, Douglas W., 4,232,277, Cl. 331-107.0DP.
Randhawa, Jagir S., 4,232,225, Cl. 250-361.00C.
Roth, Milton, 4,231,822, Cl. 149-109.600.
Weiss, Gerald; Scharf, Gerson; Guido, Anthony A.; and Lazardwitz, Benjamin, 4,232,187, Cl. 178-22.000.
Energy: *See—*
Baker, William R., 4,232,351, Cl. 361-56.000.
Clark, Grady W.; Holder, John D.; and Pasto, Arvid E., 4,231,796, Cl. 75-206.000.
Fink, Joel H.; and Molvik, Arthur W., 4,232,244, Cl. 313-363.000.
Gibson, Robert C.; and Korenko, Michael K., 4,231,795, Cl. 75-171.000.
Quinby, Thomas C., 4,231,507, Cl. 228-131.000.
Reich, Frederich R.; and Schwankoff, Albert R., 4,232,228, Cl. 250-492.00R.
Shanks, Howard R.; Bevolo, Albert J.; Danielson, Gordon C.; and Weber, Michael F., 4,232,097, Cl. 429-44.000.
Winsche, Warren E., 4,231,771, Cl. 55-408.000.
Zeldin, Arkady; Carciello, Neal; Kukacka, Lawrence; and Fontana, Jack, 4,231,917, Cl. 260-37.0SB.
Interior: *See—*
Huiatt, Jerry L.; Shurtz, Melvin D.; and Potter, George M., 4,231,859, Cl. 209-11.000.
MacDonald, David J., 4,231,994, Cl. 423-70.000.
Moser, Kenneth W.; Siemens, Richard E.; and Rhoads, Stanley C., 4,231,866, Cl. 210-660.000.
Sandberg, Richard G.; and Hebble, Terry L., 4,231,993, Cl. 423-34.000.
Spiegler, Kurt S., 4,231,865, Cl. 210-636.000.
Navy: *See—*
Adrian, Donald J., 4,232,314, Cl. 343-7.0PF.
Beckert, Werner F.; Barber, William H.; and Dengel, Ottmar H., 4,231,891, Cl. 252-188.000.
Fleishman, Herman B., 4,232,313, Cl. 343-6.00R.
Longerich, Ernest P., 4,231,311, Cl. 114-244.000.

U.S. Philips Corporation: *See—*
Filipovic, Dominik, 4,232,296, Cl. 340-167.00R.
French, Richard C., 4,232,392, Cl. 455-105.000.
Ketzer, Manfred, 4,231,504, Cl. 226-180.000.

United States Steel Corporation: *See—*
Makins, James E., Jr., 4,231,671, Cl. 403-13.000.

University Patents, Inc.: *See—*
Jensen, Elwood V.; and DeSombre, Eugene R., 4,232,001, Cl. 424-1.000.

Uno, Makoto: *See—*
Nishikawa, Kazuyoshi; Uno, Makoto; and Koga, Hideaki, 4,231,266, Cl. 74-467.000.

Unterborn, Ralph D.: *See—*
Hawk, Rufus L.; and Unterborn, Ralph D., 4,231,721, Cl. 417-413.000.

UOP Inc.: *See—*
Antos, George J., 4,231,897, Cl. 252-441.000.

Upjohn Company, The: *See—*
Magerlein, Barney J., 4,232,148, Cl. 536-17.00R.
Martin, David G., 4,232,164, Cl. 548-240.000.

Urakawa, Chikahiro: *See—*
Nakano, Kinichi; Urakawa, Chikahiro; and Imai, Ryoji, 4,231,936, Cl. 260-326.240.

Urano, Toshihiro: *See—*
Kokaji, Norio; Kinoshita, Kunio; Urano, Toshihiro; and Saito, Katsunori, 4,232,323, Cl. 346-74.100.

Urbain, Jean-Luc: *See—*
Cowx, Henry; and Urbain, Jean-Luc, 4,231,912, Cl. 260-29.7SQ.

Urbinati, Mario; and Conti, Luigi, to Centro Ricerche Fiat S.p.A. Air induction systems for diesel engines. 4,231,344, Cl. 123-518.000.

Usukura, Koji, to Tokyo Eizai Lab. Co., Ltd. Surgical immobilizing bandage and the like. 4,231,356, Cl. 128-90.000.

Vakil, Himanshu B.; and Silverstein, Seth D., to General Electric Company. Heat recovery high intensity discharge lamp constructions. 4,232,360, Cl. 362-294.000.

Valdemarsson, Stefan: *See—*
Dahle, Orvar; Einarsson, Olov; Lindkvist, Folke; and Valdemarsson, Stefan, 4,231,145, Cl. 29-432.000.

Vall, Seymour, to Falcon Safety Products, Inc. Sailing vessel self steerer. 4,231,308, Cl. 114-144.00R.

Valladares Barrocas, Helcio V; de Castro M. da Silva, Joao B.; and Coutinho de Assis, Ruy, to Petroleo Brasileiro S.A.-Petrobras. Process for preparing ethene. 4,232,179, Cl. 585-640.000.

Valley Mineral Products Corporation: *See—*
Holt, John P.; and Cash, Theodore P., 4,231,800, Cl. 106-58.000.

Valleylab, Inc.: *See—*
Newton, David W., 4,231,372, Cl. 128-303.140.

Valmet Oy: *See—*
Ojala, Pertti, 4,231,842, Cl. 162-47.000.

Valton S.A.: *See—*
Boucraut, Frantz M., 4,231,563, Cl. 271-18.300.

Vamvakas, Michael, to Niagara Bottle Washer Manufacturing Co. Bottle stream combiner and divider. 4,231,463, Cl. 198-446.000.

Vance, Robert L.; and Noll, Robert W., to Acutherm, Inc. Thermally actuated diffuser. 4,231,513, Cl. 236-49.000.

Vander, Timen; Thijssen, Nicolaas J.; de Blok, Jan F.; and Middel, Jan, to Hoogovens Ijmuiden, B.V. Equipment for emission-free operation of a coking plant. 4,231,845, Cl. 202-113.000.

van der Lely, Cornelis. Soil cultivating machine. 4,231,305, Cl. 111-7.000.
van der Lely, Cornelis. Overload couplings. 4,231,443, Cl. 180-53.00D.
Vanderline, Walpy. Process and a device for making anchorages in soils and rocks. 4,231,683, Cl. 405-260.000.
Van Doren, Bernard M.; and Frank, Jacques G., to Etablissements VanDoren. Device for trimming the reeds of wind instruments. 4,231,404, Cl. 144-2.00R.
Van Dyke, John W., Jr.: *See*—
Schut, Robert N.; Snoke, Edgar O.; and Van Dyke, John W., Jr., 4,232,160, Cl. 546-146.000.
Van Haasteren, Adrian J., Jr.: *See*—
Demick, Eugene; and Van Haasteren, Adrian J., Jr., 4,231,643, Cl. 353-86.000.
Van Moorsel, William H.: *See*—
Barron, John W.; and Van Moorsel, William H., 4,231,839, Cl. 159-47.0UA.
Vannan, Frederick F., Jr., to Goodyear Tire & Rubber Company, The. Pre-shaped plastic reinforcing member and a tire encapsulating said member. 4,231,410, Cl. 152-356.00R.
Van Slooten, Louis J., to General Motors Corporation. Roller hydraulic valve lifter. 4,231,267, Cl. 74-569.000.
van Zelm, Willem D. Gripping device for handicapped persons. 4,231,603, Cl. 294-19.00R.
Vapor Corporation: *See*—
Daugiras, Kristupas; and Elguindy, Samir M., 4,231,192, Cl. 49-363.000.
Varitrac AG: *See*—
Heerema, Pieter S.; Horowitz, Alexandre; and Willemsen, Henricus P., 4,231,313, Cl. 114-265.000.
VDO Adolf Schindling AG: *See*—
Leber, Dieter, 4,231,250, Cl. 73-290.00V.
VEB Jenapharm: *See*—
Ponsold, Kurt; Prousa, Richard; Oettel, Michael; Strecke, Joachim; and Hoffmann, Herbert, 4,231,946, Cl. 260-397.400.
Verbatim Corporation: *See*—
Popov, George D.; and Robinson, Howard W., 4,231,532, Cl. 242-199.000.
Verburgh, Martin B.: *See*—
Rhodes, Cyril E.; and Verburgh, Martin B., 4,232,094, Cl. 428-614.000.
Verdicchio, Robert J.: *See*—
Lindemann, Martin K. O.; and Verdicchio, Robert J., 4,231,903, Cl. 252-545.000.
Vereinigte Elektrizitatswerke Westfalen AG: *See*—
Ruckert, Hans, 4,231,852, Cl. 204-196.000.
Versluis, Ronald, to B.V. Neratoom. Non-return valve. 4,231,395, Cl. 137-514.700.
Vertut, Jean: *See*—
Balligand, Pierre; Corfa, Yves; Lemercier, Pierre; Marchal, Paul; and Vertut, Jean, 4,231,171, Cl. 37-54.000.
Vicon Espana S.A.: *See*—
Delgado, Luis D., 4,231,218, Cl. 56-377.000.
Victor Company of Japan, Ltd.: *See*—
Motoyama, Koichiro; Takanashi, Itsuo; Miyoshi, Tadayoshi; Nakagaki, Shintaro; Yokokawa, Sumio; and Miyazaki, Kenichi, 4,232,331, Cl. 358-44.000.
Viggo AB: *See*—
Rash, Douglas L., 4,231,367, Cl. 128-214.400.
Vikre, Merle A. Irrigation system and volume control valve therefor. 4,231,523, Cl. 239-454.000.
Vila, Jose F. Pencil driven mechanical pencil sharpener. 4,231,405, Cl. 144-28.400.
Villavicencio, Eduardo J., to Process Evaluation & Development Corporation. Bagasse depithing. 4,231,136, Cl. 19-7.000.
Vinals, Joaquin F.: *See*—
Sprecker, Mark A.; Schmitt, Frederick L.; Vock, Manfred H.; Vinals, Joaquin F.; and Kiwala, Jacob, 4,231,940, Cl. 260-345.100.
Vincent, Gary A.: *See*—
Fearon, Frederick W. G.; and Vincent, Gary A., 4,231,909, Cl. 260-29.1SB.
Visalli, Robert G., to Kerotest Manufacturing Corp. Valve stem and valve disc connection for a diaphragm valve. 4,231,549, Cl. 251-335.00A.
Vivona, Daniel N.: *See*—
Buerkley, Donald D.; Sweeny, Norman P.; and Vivona, Daniel N., 4,232,083, Cl. 428-307.000.
VLSI Technology Research Association: *See*—
Iwamatsu, Seiichi, 4,231,657, Cl. 355-71.000.
Vnuchenko, Nikolai S.: *See*—
Unigovsky, Mikhail R.; Rulevsky, Evgeny V.; Sapa, Fedor I.; Parkhomchuk, Alexei T.; Yampolsky, Arnold S.; Rotenfeld, Veniamin S.; Ivanov, Vasily T.; Nemirovsky, Isaak Y.; Kovalenko, Viktor M.; and Vnuchenko, Nikolai S., 4,231,694, Cl. 409-179.000.
Vock, Manfred H.: *See*—
Sprecker, Mark A.; Schmitt, Frederick L.; Vock, Manfred H.; Vinals, Joaquin F.; and Kiwala, Jacob, 4,231,940, Cl. 260-345.100.
Voegele, Guenther: *See*—
Strampfer, Armin; and Voegele, Guenther, 4,231,211, Cl. 53-452.000.
Vogel, John D.: *See*—
Groth, Hugh F.; Vogel, John D.; and Hunt, Guilbert M., 4,231,668, Cl. 401-146.000.
Vogelhut, Paul O., to Miles Laboratories, Inc. Chemiluminescent analytical device. 4,231,754, Cl. 23-230.00R.
Volkswagenwerk Aktiengesellschaft: *See*—
Buchholz, Peter; Warnecke, Rolf; and Beier, Alfred, 4,231,727, Cl. 418-76.000.
Konig, Axel, 4,231,720, Cl. 417-379.000.
Voll, Walter. Apparatus to indicate the spacing between a vehicle and a metal article. 4,232,286, Cl. 340-51.000.
Vurpillat, Victor V.: *See*—
Bell, Vincent G., Jr.; Burke, Thomas P.; Margolin, George D.; and Vurpillat, Victor V., 4,231,593, Cl. 283-6.000.
W. R. Grace & Co.: *See*—
Siemer, Sidney R.; Gordon, Richard S.; and Nickell, Louis G., 4,231,788, Cl. 71-113.000.
Stewart, Robert M.; and Schwartz, Robert W., 4,231,227, Cl. 62-57.000.
W. S. Shamban & Co.: *See*—
Traub, Henry A., 4,231,578, Cl. 277-121.000.
Wachi, Masatada, to Nippon Gakki Seizo Kabushiki Kaisha. Process for forming musical tones. 4,231,277, Cl. 84-1.190.
Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH: *See*—
Herzer, Heinz; Rath, Heinz-Jorg; and Schmidt, Dietrich, 4,231,755, Cl. 23-293.00R.
Wada, Nobuhide: *See*—
Shinohara, Akira; Wada, Nobuhide; Tokunaga, Yukio; and Yazawa, Chihiro, 4,231,963, Cl. 564-443.000.
Wada, Tomio: *See*—
Funada, Fumiaki; Nonomura, Keisaku; Uede, Hisashi; and Wada, Tomio, 4,231,640, Cl. 350-336.000.
Wadey, Raymond C. C.: *See*—
Hodgkins, Bernard E.; and Wadey, Raymond C. C., 4,231,589, Cl. 280-781.000.
Wagner, Norbert, to Linde AG. Method of making a plate-type heat exchanger. 4,231,508, Cl. 228-219.000.
Waibel, Gottfried; Maurischat, Gunther; and Webersik, Heinz, to AG-FA-Gevaert, A.G. Electrostatic copying apparatus. 4,231,319, Cl. 118-655.000.
Waldrum, John E. Liquid sprayer. 4,231,520, Cl. 239-171.000.
Walker, Maurice; Wheeley, Buren R.; and Glass, Charles A., to Royal Crown Cola Company. Self-synchronizing bottle carrier applicator. 4,231,209, Cl. 53-48.000.
Wallace, Charles C. Gate for use in a gate valve. 4,231,388, Cl. 137-242.000.
Wallace, Lloyd F.: *See*—
Savoye, Eugene D.; Edwards, Thomas W.; and Wallace, Lloyd F., 4,232,245, Cl. 313-367.000.
Waller, Michael R., to Standard Oil Company (Indiana). Marine riser insert sleeves. 4,231,436, Cl. 175-7.000.
Wallwork, Charles M. G. Handling foundry materials. 4,231,414, Cl. 164-154.000.
Walsh, J. William; and Bietry, Raymond E., Jr., to Becton, Dickinson & Company. Radial scanner. 4,231,661, Cl. 356-340.000.
Walter, Alfred, to Alfred Walter AG. Apparatus for perforating a paper sample. 4,231,273, Cl. 83-510.000.
Wang, Samuel S.; and Lewellyn, Morris E., to American Cyanamid Company. Process for dewatering mineral and coal concentrates. 4,231,868, Cl. 210-728.000.
Ward, William H.; and Ward, William H., Jr. Container closure spout construction and method of forming same. 4,231,488, Cl. 220-288.000.
Ward, William H., Jr.: *See*—
Ward, William H.; and Ward, William H., Jr., 4,231,488, Cl. 220-288.000.
Warman, Bloomfield J. Device for establishing conference calls via at least one telephone exchange switching system. 4,232,198, Cl. 179-18.0BC.
Warnecke, Rolf: *See*—
Buchholz, Peter; Warnecke, Rolf; and Beier, Alfred, 4,231,727, Cl. 418-76.000.
Warner-Lambert Company: *See*—
Satzinger, Gerhard; Herrmann, Manfred F.; and Hechtfischer, Gustav, 4,231,933, Cl. 260-326.5FL.
Warren, Gregory L.: *See*—
Adams, Halbert E.; Cooper, Edgar R.; Ford, Lowell D.; Johnson, Delbert C.; and Warren, Gregory L., 4,232,378, Cl. 367-36.000.
Watanabe, Hiroyuki, to Tomy Kogyo Co., Inc. Portable obstacle toy. 4,231,571, Cl. 273-1.00E.
Watanabe, Makoto. Apparatus for cleaning inner surfaces of hollow cylindrical container. 4,231,132, Cl. 15-56.000.
Watanabe, Ryuji; Arakawa, Hideo; and Kuniya, Keiichi, to Hitachi, Ltd. Method of producing a vacuum circuit breaker. 4,231,814, Cl. 148-11.50C.
Watanabe, Toshiro; and Suzuki, Koji, to Sony Corporation. Image display apparatus. 4,232,341, Cl. 358-250.000.
Waterbury, L. David, to Syntex (U.S.A.) Inc. Compositions for and a method of preventing diabetic complications. 4,232,040, Cl. 424-283.000.
Watson, Kenneth, to Westland Aircraft Limited. Helicopter rotor. 4,231,705, Cl. 416-108.00R.
Watson, Roger W.: *See*—
Udelhofen, John H.; and Watson, Roger W., 4,231,759, Cl. 44-75.000.
Waxman, Albert S.; and Havlice, James F., to Diasonics. Ultrasonic imaging apparatus. 4,231,373, Cl. 128-660.000.
Weber, Heinrich; Lorenz, Kurt; Dungs, Horst; Kurtz, Roman; and Kersting, Hans-Joachim, to Carl Still GmbH & Co. KG, Firma; and

Rheinische Braunkohlwerke AG. Method and apparatus for producing abrasion resistant coke from brown coal briquets. 4,231,844, Cl. 201-34.000.

Weber, Marcel, to Societe Samibem, S.A. Mower with bottom-driven cutter discs. 4,231,216, Cl. 56-13.600.

Weber, Michael F.: *See—*
Shanks, Howard R.; Bevolo, Albert J.; Danielson, Gordon C.; and Weber, Michael F., 4,232,097, Cl. 429-44.000.

Webers, Werner: *See—*
Brandes, Gunter; Wollner, Johannes; Neier, Wilhelm; and Webers, Werner, 4,231,966, Cl. 568-396.000.

Webersik, Heinz: *See—*
Waibel, Gottfried; Maurischat, Gunther; and Webersik, Heinz, 4,231,319, Cl. 118-655.000.

Wegmann, Helmut: *See—*
Moser, Kurt; and Wegmann, Helmut, 4,231,652, Cl. 355-3.0DR.

Weichel, Ernst. Detachable harvesting unit. 4,231,431, Cl. 171-46.000.

Weigert, Kurt: *See—*
Hudek, Karl; and Weigert, Kurt, 4,231,374, Cl. 128-702.000.

Weik, Manfred: *See—*
Schmid, Manfred; Elsaber, Martin; and Weik, Manfred, 4,231,234, Cl. 66-27.000.

Weikert, Roy J. Process of manufacturing laminated web. 4,231,832, Cl. 156-244.140.

Weiler, Wolfgang, to Motoren- und Turbinen-Union Muenchen GmbH. Variable guide vane arrangement and configuration for compressor of gas turbine devices. 4,231,703, Cl. 415-159.000.

Weingartner, Charles E. Heat control systems. 4,231,516, Cl. 237-51.000.

Weinstein, Marvin J.: *See—*
Taplin, David; Weinstein, Marvin J.; Testa, Raymond T.; Marquez, Joseph A.; and Patel, Mahesh G., 4,232,006, Cl. 424-177.000.

Weiss, Gerald; Scharf, Gerson; Guido, Anthony A.; and Lazardwitz, Benjamin, to United States of America, Army. Teletype character modification unit. 4,232,187, Cl. 178-22.000.

Weiss, Thomas R.; and Kennedy, Matthew R., to Tesserax Inc. Resonating chamber. 4,231,446, Cl. 181-148.000.

Welsh National School of Medicine, The: *See—*
Nogrady, Stephen G., 4,232,002, Cl. 424-45.000.

Wendt, Alan C., to United States Gypsum Company. Steel edge gypsum wall panel. 4,231,205, Cl. 52-481.000.

Wengert, Dieter: *See—*
Merkle, Theodor; Hausenblas, Bernhard; Schweickert, Hermann; and Wengert, Dieter, 4,231,594, Cl. 285-3.000.

Weninger, A. Edwin: *See—*
Pearson, Robert M.; and Weninger, A. Edwin, 4,231,362, Cl. 128-205.150.

Wenzek, Gerhard: *See—*
Finkenzeller, Johann; Holzermer, Guenter; and Wenzek, Gerhard, 4,232,227, Cl. 250-468.000.

Werner, Peter: *See—*
Drews, Ulrich; Schnurle, Hans; Horbelt, Michael; Schmidt, Bernhard; and Werner, Peter, 4,231,345, Cl. 123-510.000.

Wernli, Max, to Georg Fischer Aktiengesellschaft. Apparatus for the production of foundry sand molds. 4,231,415, Cl. 164-160.000.

Werst, Joseph L., to RCA Corporation. Electron beam moving apparatus for a color cathode ray tube. 4,232,283, Cl. 335-212.000.

Weschenfelder, Otto T.; and Michalik, Horst B., to Koenig & Bauer Aktiengesellschaft. Folding jaw cylinder. 4,231,559, Cl. 493-426.000.

Western Electric Company, Inc.: *See—*
Lynch, Brian; and Partus, Fred P., 4,231,777, Cl. 65-109.000.

Westinghouse Electric Corp.: *See—*
Burns, David C., 4,231,690, Cl. 408-80.000.
Graham, Kingsley F.; and Gopal, Raj, 4,232,224, Cl. 250-356.000.
Haderer, Norman G.; and Troy, J. Harold, 4,231,151, Cl. 29-605.000.
Hickam, William M.; Lin, Ching-Yu; and Zomp, John M., 4,231,733, Cl. 431-76.000.
Kraft, Joseph K., 4,231,452, Cl. 188-171.000.
Lang, Glenn E.; Crotzer, Milburn E.; and Fuoto, John S., 4,231,328, Cl. 122-504.000.
Myron, Donald L.; and Berringer, Robert T., 4,231,843, Cl. 176-50.000.
Rieben, Stuart L., 4,231,696, Cl. 414-5.000.

Westland Aircraft Limited: *See—*
Watson, Kenneth, 4,231,705, Cl. 416-108.00R.

Weston, Robert M., Sr. Cargo loading and unloading apparatus for trucks. 4,231,695, Cl. 410-69.000.

Wetherill, William H.: *See—*
Campbell, Ivor E.; Henderson, James M.; Johnson, Walter; and Wetherill, William H., 4,231,995, Cl. 423-242.000.

Whalin, Jeffery A.: *See—*
Dworsky, Lawrence N.; Whalin, Jeffery A.; and Glotzbach, Warren P., 4,232,239, Cl. 310-312.000.

Wheelabrator-Frye Inc.: *See—*
Jones, George F., 4,231,196, Cl. 51-313.000.

Wheeley, Buren R.: *See—*
Walker, Maurice; Wheeley, Buren R.; and Glass, Charles A., 4,231,209, Cl. 53-48.000.

White Consolidated Industries, Inc.: *See—*
Stolle, James R., 4,231,292, Cl. 101-137.000.

White, Eugene W.; Hanusiak, William M.; and White, Rodney A., to Research Corporation. High surface area permeable material. 4,231,979, Cl. 264-81.000.

White Farm Equipment Company: *See—*
Hedtke, Robert G.; Harrom, Harley A.; Kelley, Wilfred H., Jr.; and Frederick, Sherman B., 4,231,450, Cl. 187-9.00R.

White, Jerry R.: *See—*
Dickey, Fred M.; White, Jerry R.; and Crill, James, 4,231,656, Cl. 355-71.000.

White, Rodney A.: *See—*
White, Eugene W.; Hanusiak, William M.; and White, Rodney A., 4,231,979, Cl. 264-81.000.

Whitehead, Alan G.; and Tite, David J., to National Research Development Corporation. Apparatus for injecting granular material in soil. 4,231,306, Cl. 111-86.000.

Whiteman, Aharon E.: *See—*
Shoher, Itzhak; and Whiteman, Aharon E., 4,231,740, Cl. 433-208.000.

Whitfield, Carroll J.; and Lastinger, Anthony W., to Kelley Manufacturing Co. Cultivator with tool support arm and latch for holding same in raised non-working position. 4,231,433, Cl. 172-662.000.

Whittaker, Graham: *See—*
Hutchinson, John; and Whittaker, Graham, 4,231,849, Cl. 204-59.00F.

Whitwell, Robert J.: *See—*
Galvin, Michael E.; and Whitwell, Robert J., 4,231,228, Cl. 62-77.000.

Widdowson, Richard E.; and Atkinson, Ward J., to General Motors Corporation. Compressor modulation delay valve for variable capacity compressor. 4,231,713, Cl. 417-222.000.

Wieland-Werke Aktiengesellschaft: *See—*
Kern, Horstmar; and Botzenhardt, Helmut, 4,231,207, Cl. 52-730.000.

Wier, Donald R.: *See—*
Needham, Riley B.; Thomas, Charles P.; and Wier, Donald R., 4,231,428, Cl. 166-280.000.

Wilde, Ulrich: *See—*
Oppenlander, Harry; and Wilde, Ulrich, 4,231,684, Cl. 405-291.000.

Wildonger, Kenneth J.: *See—*
Christensen, Burton G.; Leanza, William J.; and Wildonger, Kenneth J., 4,232,030, Cl. 424-263.000.

Wilhelms, Otto-Henning: *See—*
Winter, Werner; Hindermayr, Herman; Roesch, Egon; Roesch, Androniki; and Wilhelms, Otto-Henning, 4,232,024, Cl. 424-251.000.

Wilkinson, Richard L.: *See—*
Winslow, John S.; and Wilkinson, Richard L., 4,232,337, Cl. 358-128.500.

Willemsen, Henricus P.: *See—*
Heerema, Pieter S.; Horowitz, Alexandre; and Willemsen, Henricus P., 4,231,313, Cl. 114-265.000.

William Prym, Inc.: *See—*
Ebreo, Mark A.; and Koches, Andrew, 4,231,140, Cl. 24-237.000.

Wm. Steinen Mfg. Co.: *See—*
Aprea, George F.; and Pohle, Werner P., 4,231,524, Cl. 239-468.000.

Williams, Thomas A.; and Scholze, Alfred O., to Lam, Inc. Family of modular lamps for indirect lighting. 4,232,362, Cl. 362-410.000.

Williams, William J. Billiard cue having a quick connector for the handle portion thereof. 4,231,574, Cl. 273-68.000.

Willitts, Benjamin R., to Emhart Industries, Inc. Energy conservation system having improved means for controlling receiver pressure. 4,231,229, Cl. 62-196.00A.

Willoner, Gideon, to GTE Lenkurt Electric (Canada) Ltd. Digitally programmable active RC bandpass filter with constant absolute bandwidth. 4,232,269, Cl. 330-85.000.

Willox, J. Hebden. Guy guard and method of installing same. 4,231,208, Cl. 52-741.000.

Wilson, Charles A.: *See—*
Burk, George A.; Reineke, Charles E.; and Wilson, Charles A., 4,232,041, Cl. 424-304.000.

Wilson, Clarence P., to Imperial Screen Company, Inc. Protective window screen assembly. 4,232,310, Cl. 340-550.000.

Wilson, James F.; and Craig, James C., to PPG Industries, Inc. Press polishing and laminating plastic transparencies using polycarbonate pressing plates. 4,231,827, Cl. 156-214.000.

Wimmer, Josef: *See—*
Hrabal, Hans; and Wimmer, Josef, 4,231,394, Cl. 137-512.000.

Winch, Allen R., to Cotton, Incorporated. Apparatus and method for impregnating a dry fiber batt. 4,231,129, Cl. 8-149.100.

Windecker, Leo J., to International Harvester Company. Impact resistant composite structure. 4,232,069, Cl. 428-47.000.

Winkelmann, Heinrich: *See—*
Hanisch, Horst; Winkelmann, Heinrich; and Fischer, Adolf, 4,231,265, Cl. 474-152.000.

Winkelmann and Pannhoff and Bayerische Motoren Werke Aktiengesellschaft: *See—*
Hanisch, Horst; Winkelmann, Heinrich; and Fischer, Adolf, 4,231,265, Cl. 474-152.000.

Winsche, Warren E., to United States of America, Energy. Dispersoid separation method and apparatus. 4,231,771, Cl. 55-408.000.

Winslow, John S.; and Wilkinson, Richard L., to MCA Discovision, Inc. Method and apparatus for tracking an optically readable information track. 4,232,337, Cl. 358-128.500.

Winter, Werner; Hindermayr, Herman; Roesch, Egon; Roesch, Androniki; and Wilhelms, Otto-Henning, to Boehringer Mannheim GmbH. 1-Oxo-1H-pyrimido[6,1-b]benzthiazole derivatives. 4,232,024, Cl. 424-251.000.

Winters, Giorgio; and Di Mola, Nunzio, to Gruppo Lepetit S.p.A. Treatment of psychic disorders and inflammation with fused isoquinolines. 4,232,017, Cl. 424-246.000.
Wirfs, Mark C.: *See*—
Stevens, Joel B.; and Wirfs, Mark C., 4,232,066, Cl. 427-430.100.
Wisco Corporation: *See*—
Sorensen, Norman L., 4,231,608, Cl. 296-216.000.
Sorensen, Norman L., 4,231,609, Cl. 296-218.000.
Wise, Layton A., to Mine Safety Appliances Company. Breathing apparatus flow device. 4,231,361, Cl. 128-202.260.
Wissner, Allan, to American Cyanamid Company. 15-Deoxy-16-hydroxy-17-methylene prostaglandins of the E and F series. 4,232,166, Cl. 560-121.000.
Witt, David. Methods and apparatus for installing clutches in automatic transmissions. 4,231,147, Cl. 29-433.000.
Wodka, Michael A.: *See*—
Propst, Robert L.; and Wodka, Michael A., 4,231,630, Cl. 339-22.00R.
Woerz, Hans: *See*—
Pape, Dieter; and Woerz, Hans, 4,231,691, Cl. 408-185.000.
Woike, Bernd: *See*—
Zloczysti, Stefan; and Woike, Bernd, 4,231,360, Cl. 128-201.180.
Wojcik, David R.: *See*—
Dion, Donald F.; and Wojcik, David R., 4,232,376, Cl. 365-222.000.
Wolf, Johann. Apparatus for clearing silage or similar material. 4,231,688, Cl. 406-76.000.
Wolfrum, Gerhard: *See*—
Hugl, Herbert; and Wolfrum, Gerhard, 4,231,748, Cl. 8-668.000.
Wollner, Johannes: *See*—
Brandes, Gunter; Wollner, Johannes; Neier, Wilhelm; and Webers, Werner, 4,231,966, Cl. 568-396.000.
Wood, Donald A.: *See*—
Ceprini, Mario Q.; Collins, John D.; Hoch, Samuel; and Wood, Donald A., 4,231,949, Cl. 260-429.700.
Wood, John G.: *See*—
Compton, Peter A.; and Wood, John G., 4,231,476, Cl. 206-519.000.
Woodhead, James L., to United Kingdom Atomic Energy Authority. Process for preparing aqueous dispersion of ceria and resulting product. 4,231,893, Cl. 252-313.00R.
Woodhouse, Robert C.: *See*—
Posthuma, Albert E.; and Woodhouse, Robert C., 4,232,003, Cl. 424-81.000.
Woschee, Dieter: *See*—
Frankle, Gerhard; and Woschee, Dieter, 4,231,346, Cl. 123-457.000.
Wotruba, Gottfried: *See*—
Lingstaedt, Ernst; Moegen, Gerhard; and Wotruba, Gottfried, 4,232,261, Cl. 323-22.00R.
Wolton, David R.; Dickerson, Carroll D.; and Makowski, Lawrence A., to Ford Motor Company. Adjusting sleeve assembly. 4,231,588, Cl. 280-661.000.
Wrast, Richard E.; Gardiner, William J.; and Shedd, Francis A., to Gates Rubber Company, The. Process for forming V-belts and belt sleeves. 4,231,826, Cl. 156-138.000.
Wrathall, Robert S., to Motorola, Inc. Spark and dwell ignition control system using digital circuitry. 4,231,332, Cl. 123-416.000.
Wright Dow Corning: *See*—
Lewis, Frank M., 4,231,121, Cl. 3-1.910.
Wright, William: *See*—
Eaton, Burrows P.; and Wright, William, 4,231,421, Cl. 165-68.000.
Wright, William E.: *See*—
Gratzer, Nelson R.; and Wright, William E., 4,231,230, Cl. 62-503.000.
Wright, William S.; and Loewenstern, Kenneth M., to Drexelbrook Controls, Inc. Level measuring system using admittance sensing. 4,232,300, Cl. 340-840.390.
Xerox Corporation: *See*—
Horgan, Anthony M.; and Radler, Richard W., Jr., 4,232,102, Cl. 430-58.000.
Limburg, William W.; and Pai, Damodar M., 4,232,103, Cl. 430-59.000.
Smith, Henry E., 4,231,674, Cl. 403-233.000.
Ziehm, Richard T., 4,231,567, Cl. 271-259.000.
Yagi, Kouichi; and Nakagawa, Yunosuke, to Kao Soap Co., Ltd. Bleaching composition causing no color change or fading of colored and figured cloths. 4,231,890, Cl. 252-186.000.
Yamada, Keiichi. Attachment for bolt tightening and removing device. 4,231,271, Cl. 81-57.300.
Yamada, Kenji: *See*—
Satoh, Eiji; Kohama, Masayuki; Yokoya, Kunihiko; Yamada, Kenji; and Nemoto, Akira, 4,231,673, Cl. 403-125.000.
Yamaha Hatsukoko Kabushiki Kaisha: *See*—
Matsumoto, Hiromitsu; and Sugiyama, Keiichi, 4,231,339, Cl. 123-568.000.
Yamamoto, Hideaki; Tsukada, Toshihisa; Maruyama, Eiichi; and Inagaki, Hiroya, to Nippon Telegraph and Telephone Public Corporation; and Hitachi, Ltd. Photosensor. 4,232,219, Cl. 250-227.000.
Yamamoto, Kazuo: *See*—
Magane, Shigeo; and Yamamoto, Kazuo, 4,231,590, Cl. 280-803.000.
Yamamoto, Osamu: *See*—
Touyama, Ryousuke; Inouye, Hiroyuki; Shingu, Tetsuro; Takeda, Yoshio; Ikumoto, Takeshi; Okuyama, Hidetoshi; and Yamamoto, Osamu, 4,232,159, Cl. 546-112.000.
Yamamoto, Seiichi; and Kitayama, Seishi, to Kokusai Denshin Denwa Kabushiki Kaisha. Echo control system. 4,232,400, Cl. 455-305.000.
Yamamoto, Syunichi: *See*—
Kato, Osamu; Uemura, Seiichi; Yamamoto, Syunichi; Hirose, Takao; and Takashima, Hiroaki, 4,231,857, Cl. 208-40.000.
Yamasaki, Tetsuro: *See*—
Naito, Takayuki; Nakagawa, Susumu; Yamasaki, Tetsuro; Okita, Taka-Aki; and Yamashita, Haruhiro, 4,232,155, Cl. 544-277.000.
Yamashita, Haruhiro: *See*—
Naito, Takayuki; Nakagawa, Susumu; Yamasaki, Tetsuro; Okita, Taka-Aki; and Yamashita, Haruhiro, 4,232,155, Cl. 544-277.000.
Yamashita, Keitaro: *See*—
Asanae, Masumi; and Yamashita, Keitaro, 4,231,320, Cl. 118-657.000.
Yamauchi, Kazuhisa; Tanaka, Taku; Kawai, Syuji; and Tanii, Hirokuni, to Kuraray Co., Ltd. Blood dialyzer. 4,231,877, Cl. 210-321.00B.
Yamauchi, Tamotu: *See*—
Shioi, Ryoichi; and Yamauchi, Tamotu, 4,232,214, Cl. 219-541.000.
Yampolsky, Arnold S.: *See*—
Unigovsky, Mikhail R.; Rulevsky, Evgeny V.; Sapa, Fedor I.; Parkhomchuk, Alexei T.; Yampolsky, Arnold S.; Rotenfeld, Veniamin S.; Ivanov, Vasily T.; Nemirovsky, Isaak Y.; Kovalenko, Viktor M.; and Vnuchenko, Nikolai S., 4,231,694, Cl. 409-179.000.
Yanagida, Tuneo: *See*—
Satoh, Ken; and Yanagida, Tuneo, 4,232,348, Cl. 360-74.100.
Yanagisawa, Syozo: *See*—
Kuwahara, Akiyasu; and Yanagisawa, Syozo, 4,231,337, Cl. 123-568.000.
Yanai, Tosiharu: *See*—
Okino, Seiki; Nakata, Kunio; Yanai, Tosiharu; and Kandachi, Takayoshi, 4,232,062, Cl. 427-160.000.
Yanshevsky, Vladimir A.: *See*—
Adigamov, Engel R.; Gurvich, Yakov A.; Liakumovich, Alexandr G.; Logutov, Igor J.; Michurov, Jury I.; Polenov, Alexei S.; and Yanshevsky, Vladimir A., 4,232,176, Cl. 568-756.000.
Yasuda, Katsuya; and Adachi, Akio, to Hochiki Corporation. Data transmitter device. 4,232,292, Cl. 340-147.0SY.
Yasuda, Syoichi; and Nishioka, Yoshiki, to Sharp Kabushiki Kaisha. Handwritten character identification. 4,232,290, Cl. 340-146.30Z.
Yazawa, Chihiro: *See*—
Shinohara, Akira; Wada, Nobuhide; Tokunaga, Yukio; and Yazawa, Chihiro, 4,231,963, Cl. 564-443.000.
Yazu, Shuji: *See*—
Hara, Akio; and Yazu, Shuji, 4,231,762, Cl. 51-309.000.
Yee, Sammy K.: *See*—
Higuchi, Hobart A.; and Yee, Sammy K., 4,232,363, Cl. 363-75.000.
Yokogawa Electric Works, Ltd.: *See*—
Kaieda, Nobuo; and Okano, Yoshihiro, 4,232,259, Cl. 318-615.000.
Yokogawa, Tomohisa, to Pioneer Electronic Corporation. Multiband radio receiver with electronic preset tuning system. 4,232,395, Cl. 455-173.000.
Yokokawa, Sumio: *See*—
Motoyama, Koichiro; Takanashi, Itsuo; Miyoshi, Tadayoshi; Nakagaki, Shintaro; Yokokawa, Sumio; and Miyazaki, Kenichi, 4,232,331, Cl. 358-44.000.
Yokoya, Kunihiko: *See*—
Satoh, Eiji; Kohama, Masayuki; Yokoya, Kunihiko; Yamada, Kenji; and Nemoto, Akira, 4,231,673, Cl. 403-125.000.
Yomogida, Toshihiko; and Suzuki, Yasuo, to Toyoda-Koki Kabushiki-Kaisha. Output converting circuit for a programmable sequence controller. 4,232,236, Cl. 307-297.000.
Yoneoka, Mikio; Osugi, Minoru; and Ikarashi, Takeo, to Mitsubishi Gas Chemical Company, Inc. Process for producing methyl formate. 4,232,171, Cl. 560-239.000.
Yoshida Kogyo K. K.: *See*—
Ishiba, Jintaro, 4,231,245, Cl. 72-253.00A.
Yoshida Kogyo K.K.: *See*—
Tsubata, Noritaka, 4,231,139, Cl. 24-205.16R.
Yoshida, Yoshitaka: *See*—
Moriconi, Leonard E.; and Yoshida, Yoshitaka, 4,232,256, Cl. 318-292.000.
Yoshikawa, Masaaki: *See*—
Chiba, Hideo; Sasaki, Ryuzo; Yoshikawa, Masaaki; Takahashi, Naofumi; Sugimoto, Etsuro; and Samejima, Hirotoshi, 4,232,044, Cl. 426-44.000.
Yoshinaga, Makoto: *See*—
Sogi, Shinroku; Yoshinaga, Makoto; Shinohara, Toshio; Aihara, Takayuki; and Tawara, Ikuo, 4,231,403, Cl. 141-284.000.
Yoshino, Koichiro: *See*—
Tsukamoto, Goro; Yoshino, Koichiro; Morita, Tominori; Nose, Takashi; and Okazaki, Mitsuo, 4,232,010, Cl. 424-200.000.
Yoshino, Yasuhisa; Kuno, Akira; and Shinoda, Yoshio, to Nippon Soken, Inc. Slope sensor for a vehicle. 4,231,257, Cl. 73-432.0CR.
Yoshizawa, Naomi: *See*—
Tokorozawa, Sadao; Shimizu, Toyoji; and Yoshizawa, Naomi, 4,231,707, Cl. 417-12.000.
Youden, Robert H.; and Robertson, Charles S. Apparatus for maximizing intersect earnings and providing payments from principal without interest penalty. 4,232,367, Cl. 364-408.000.
Young, Eldon L. Inflatable high speed boat. 4,231,131, Cl. 9-2.00C.
Young, Joe W.; and Odenthal, Charles, to C. R. Bard, Inc. Nebulizer with variable flow rate control and associated method. 4,231,973, Cl. 261-78.00A.
Young, Maurice E.: *See*—
Cobb, Delwin E.; and Young, Maurice E., 4,231,726, Cl. 418-75.000.

Youngflex S.A.: *See*—
Griffiths, David T., 4,231,615, Cl. 297-452.000.

Yu, Ruey J., to General Motors Corporation. Thermistor with more stable beta. 4,231,902, Cl. 252-519.000.

Yukawa, Takahiro: *See*—
Toyama, Akira; Ohkoshi, Akio; Toyama, Takashi; Yukawa, Takahiro; and Hosono, Takashi, 4,232,332, Cl. 358-67.000.

Yuuki, Kiyoshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas recirculation system for an internal combustion engine. 4,231,336, Cl. 123-568.000.

Z-L Limited Partnership: *See*—
Zilliken, Fritz W., 4,232,122, Cl. 435-52.000.

Zachum, Billy G.: *See*—
Smiley, Charles F.; and Zachum, Billy G., 4,232,339, Cl. 358-150.000.

Zahnradfabrik Friedrichshafen AG.: *See*—
Burckhardt, Dieter, 4,231,441, Cl. 180-6.480.

Zaima, Eiichi: *See*—
Menju, Shinichi; Takahashi, Kunio; Haginomori, Eiichi; Murakami, Yoichi; and Zaima, Eiichi, 4,231,258, Cl. 73-572.000.

Zaluska, Philip J.: *See*—
Bechara, Ibrahim S.; Mascioli, Rocco L.; and Zaluska, Philip J., 4,232,152, Cl. 544-119.000.

Zanutti, Hugo A. Vessel location system. 4,232,391, Cl. 455-96.000.

Zed Instruments Limited: *See*—
Zollman, Peter M.; and Doyle, Keith G., 4,232,345, Cl. 358-299.000.

Zeelen, Filippus J.: *See*—
Campbell, Alexander C.; Hewett, Colin L.; and Zeelen, Filippus J., 4,232,042, Cl. 424-308.000.

Zeidler, Guenter; and Oestreich, Ulrich, to Siemens Aktiengesellschaft. Communication cable with glass fiber light waveguides. 4,231,635, Cl. 350-96.230.

Zeldin, Arkady; Carciello, Neal; Kukacka, Lawrence; and Fontana, Jack, to United States of America, Energy. High temperature concrete composites containing organosiloxane crosslinked copolymers. 4,231,917, Cl. 260-37.0SB.

Zerbin, Walter Otto: *See*—
Linneborn, Hans, 4,231,302, Cl. 110-229.000.

Zhuk, Regina A.: *See*—
Paegle, Ruta A.; Lidaka, Marger J.; Zhuk, Regina A.; Maurinsh, Juris A.; Zidermane, Aina A.; and Kilevitsa, Marite K., 4,232,149, Cl. 536-23.000.

Zidermane, Aina A.: *See*—
Paegle, Ruta A.; Lidaka, Marger J.; Zhuk, Regina A.; Maurinsh, Juris A.; Zidermane, Aina A.; and Kilevitsa, Marite K., 4,232,149, Cl. 536-23.000.

Ziehm, Richard T., to Xerox Corporation. Method and apparatus for clearing jams in copiers. 4,231,567, Cl. 271-259.000.

Zielinski, Richard J.: *See*—
Rule, Charles E.; Manning, Robert G.; and Zielinski, Richard J., 4,232,050, Cl. 426-582.000.

Zigman, Seymour: *See*—
Gilman, Paul B., Jr.; Belly, Robert T.; Koszelak, Thaddeus D.; and Zigman, Seymour, 4,232,121, Cl. 435-32.000.

Zilliken, Fritz W., to Z-L Limited Partnership. Antioxidants, antioxidant compositions and methods of preparing and using same. 4,232,122, Cl. 435-52.000.

Zimmer Orthopaedic Limited: *See*—
Hodgkins, Bernard E.; and Wadey, Raymond C. C., 4,231,589, Cl. 280-781.000.

Zimmermann, Anton; and Greutert, Albert, to MAXS Aktiengesellschaft. Reusable coffee filter. 4,231,876, Cl. 210-232.000.

Zink, Stanley C., to Black Clawson Company, The. Dual blade coater. 4,231,318, Cl. 118-122.000.

Zloczysti, Stefan; and Woike, Bernd, to Auergesellschaft GmbH. Nose clip for respirators. 4,231,360, Cl. 128-201.180.

Zoecon Corporation: *See*—
Henrick, Clive A.; and Garcia, Barbara A., 4,231,953, Cl. 260-465.00D.

Zoeke, Siegfried, to Siemens Aktiengesellschaft. Device for positioning a master copy-receiving roller of a form printing device. 4,231,658, Cl. 355-110.000.

Zollar, Daniel J.: *See*—
Pierson, Roger P.; Mastalish, Lawrence V.; and Zollar, Daniel J., 4,231,491, Cl. 221-48.000.

Zoller, Heinrich: *See*—
Pirner, Miroslav; Zoller, Heinrich; and Bichsel, Heinz, 4,232,095, Cl. 428-654.000.

Zollman, Peter M.; and Doyle, Keith G., to Zed Instruments Limited. Apparatus for producing a seamless copy from an unjointed original. 4,232,345, Cl. 358-299.000.

Zomp, John M.: *See*—
Hickam, William M.; Lin, Ching-Yu; and Zomp, John M., 4,231,733, Cl. 431-76.000.

Zuban, Joseph M.: *See*—
McGinley, Emanuel J.; and Zuban, Joseph M., 4,231,802, Cl. 106-197.00C.

Zuckerman, Matthew M., to Sierra Labs, Inc. Apparatus and methods for monitoring concentrations of toxic substances in a work environment. 4,231,249, Cl. 73-23.000.

Zurner, Hansjurgen; and Fuhrmann, Wolfgang, to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft. Controllable hydraulic valve mechanism for reciprocating engines or pumps. 4,231,543, Cl. 251-57.000.

Zverev, Anatoly I.; and Bondarenko, Alexandr S. Apparatus for explosive application of coatings. 4,231,518, Cl. 239-81.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 4TH DAY OF NOVEMBER, 1980

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Boyesen, Eyvind, to Performance Industries, Inc. Engine valve means and porting. Re. 30,425, Cl. 123-73.0AA.

Brown, Harley: *See—*
Brown, Harley D.; and Brown, Harley, Re. 30,427, Cl. 137-446.000.

Brown, Harley D.; and Brown, Harley, to Brown, Harley D. Maximum liquid level control valve. Re. 30,427, Cl. 137-446.000.

Denka Chemical Corporation: *See—*
Kerr, Ralph O., Re. 30,430, Cl. 260-346.750.

Detty, Rodney H., to Eaton Corporation. Magnetically actuated viscous fluid coupling. Re. 30,428, Cl. 192-58.00B.

Dow Corning Corporation: *See—*
Falender, James R.; Mettler, Claudia M.; and Saam, John C., Re. 30,431, Cl. 525-479.000.

Eaton Corporation: *See—*
Detty, Rodney H., Re. 30,428, Cl. 192-58.00B.

Falender, James R.; Mettler, Claudia M.; and Saam, John C., to Dow Corning Corporation. Toughened mercaptosiloxane modified emulsion polymerized vinylic polymers. Re. 30,431, Cl. 525-479.000.

Haslett, Robert A., to Ricardo Consulting Engineers Limited. I.C. Engines. Re. 30,426, Cl. 123-143.00B.

Heldenbrand, Ladd L. Litter packages. Re. 30,424, Cl. 119-1.000.

Kerr, Ralph O., to Denka Chemical Corporation. Catalyst treatment. Re. 30,430, Cl. 260-346.750.

Mettler, Claudia M.: *See—*
Falender, James R.; Mettler, Claudia M.; and Saam, John C., Re. 30,431, Cl. 525-479.000.

Performance Industries, Inc.: *See—*
Boyesen, Eyvind, Re. 30,425, Cl. 123-73.0AA.

Phillips, Kevin J., to RCA Corporation. Minimization of residual spacecraft nutation due to disturbing torques. Re. 30,429, Cl. 244-169.000.

RCA Corporation: *See—*
Phillips, Kevin J., Re. 30,429, Cl. 244-169.000.

Ricardo Consulting Engineers Limited: *See—*
Haslett, Robert A., Re. 30,426, Cl. 123-143.00B.

Saam, John C.: *See—*
Falender, James R.; Mettler, Claudia M.; and Saam, John C., Re. 30,431, Cl. 525-479.000.

LIST OF DESIGN PATENTEES

Automotive Parts Industries, Inc.: *See—*
Mazliach, Samuel, 257,481, Cl. D15-140.000.

Bartel, William G.: *See—*
Bros, Daniel M.; Bartel, William G.; and Larsen, LaVerne M., 257,495, Cl. D30-32.000.

Bros, Daniel M.; Bartel, William G.; and Larsen, LaVerne M., to Hot Shot Products Co. Housing for an electric cattle prod. 257,495, 11-4-80, Cl. D30-32.000.

Carre, Alain, to Waterman S.A. Watch. 257,479, 11-4-80, Cl. D10-30.000.

Carroll, James C.; and Johns, Victor D., to Phillips Petroleum Company. Egg crate or similar article. 257,478, 11-4-80, Cl. D99-47.000.

Chromcraft Corporation: *See—*
Wilson, Robert L., 257,473, Cl. D6-35.000.

Cousins, Michael A.: *See—*
Cousins, Morison S.; and Cousins, Michael A., 257,492, Cl. D28-13.000.

Cousins, Morison S., to Gillette Company, The. Hair dryer. 257,491, 11-4-80, Cl. D28-13.000.

Cousins, Morison S.; and Cousins, Michael A., to Gillette Company, The. Hair dryer. 257,492, 11-4-80, Cl. D28-13.000.

Davis, Ronald C. Sauna. 257,490, 11-4-80, Cl. D24-37.000.

DeLuca, Raymond F. Bottle. 257,477, 11-4-80, Cl. D9-408.000.

Drake, Charles A., to Leach Industries. Game racket throat piece. 257,483, 11-4-80, Cl. D21-212.000.

Drake, Charles A., to Leach Industries. Game racket throat piece. 257,484, 11-4-80, Cl. D21-212.000.

Eyer, Donald C.: *See—*
McDonald, Jacqueline L.; Eyer, Donald C.; and Jones, Russell S., 257,474, Cl. D6-95.000.

Gillette Company, The: *See—*
Cousins, Morison S., 257,491, Cl. D28-13.000.
Cousins, Morison S.; and Cousins, Michael A., 257,492, Cl. D28-13.000.

Glendinning, Scott R. Sun clock. 257,480, 11-4-80, Cl. D10-45.000.

Hot Shot Products Co.: *See—*
Bros, Daniel M.; Bartel, William G.; and Larsen, LaVerne M., 257,495, Cl. D30-32.000.

Imhoff, Kathy S. Disposable pet dish. 257,494, 11-4-80, Cl. D30-16.000.

Johns, Victor D.: *See—*
Carroll, James C.; and Johns, Victor D., 257,478, Cl. D99-47.000.

Jones, Russell S.: *See—*
McDonald, Jacqueline L.; Eyer, Donald C.; and Jones, Russell S., 257,474, Cl. D6-95.000.

Larsen, LaVerne M.: *See—*
Bros, Daniel M.; Bartel, William G.; and Larsen, LaVerne M., 257,495, Cl. D30-32.000.

Leach Industries: *See—*
Drake, Charles A., 257,483, Cl. D21-212.000.
Drake, Charles A., 257,484, Cl. D21-212.000.

Leduc, Blake C. Football game dart board. 257,482, 11-4-80, Cl. D21-6.000.

Lodrick, Lawrence E. Dog house. 257,493, 11-4-80, Cl. D30-1.000.

Mazliach, Samuel, to Automotive Parts Industries, Inc. Boring tool holder. 257,481, 11-4-80, Cl. D15-140.000.

McDonald, Jacqueline L.; Eyer, Donald C.; and Jones, Russell S. Liquid dispenser for mounting on showers. 257,474, 11-4-80, Cl. D6-95.000.

Melitta, Inc.: *See—*
von der Luehe, Detlef M. T., 257,475, Cl. D7-41.000.

Montecalvo, Lawrence G. Room heat recirculator. 257,485, 11-4-80, Cl. D23-151.000.

Pacific Fireplace Furnishings, Inc.: *See—*
Sirois, W. James, 257,476, Cl. D8-316.000.

Phillips Petroleum Company: *See—*
Carroll, James C.; and Johns, Victor D., 257,478, Cl. D99-47.000.

Roach, Timothy J. F. Loudspeaker stand. 257,472, 11-4-80, Cl. D6-29.000.

Ryder, Francis E.: *See—*
Thomas, Michael D.; and Ryder, Francis E., 257,488, Cl. D24-9.000.
Thomas, Michael D.; and Ryder, Francis E., 257,489, Cl. D24-9.000.

Ryder International Corporation: *See—*
Thomas, Michael D., 257,486, Cl. D24-9.000.
Thomas, Michael D., 257,487, Cl. D24-9.000.
Thomas, Michael D.; and Ryder, Francis E., 257,488, Cl. D24-9.000.
Thomas, Michael D.; and Ryder, Francis E., 257,489, Cl. D24-9.000.

Siegel, Milton I. Purse. 257,471, 11-4-80, Cl. D3-52.000.

Sirois, W. James, to Pacific Fireplace Furnishings, Inc. Handle for glass fireplace screen. 257,476, 11-4-80, Cl. D8-316.000.

Thomas, Michael D., to Ryder International Corporation. Sterilizer unit. 257,486, 11-4-80, Cl. D24-9.000.

Thomas, Michael D., to Ryder International Corporation. Sterilizer unit. 257,487, 11-4-80, Cl. D24-9.000.

Thomas, Michael D.; and Ryder, Francis E., to Ryder International Corporation. Sterilizer unit. 257,488, 11-4-80, Cl. D24-9.000.

Thomas, Michael D.; and Ryder, Francis E., to Ryder International Corporation. Disinfector casing for contact lens or the like. 257,489, 11-4-80, Cl. D24-9.000.

von der Luehe, Detlef M. T., to Melitta, Inc. Coffeemaker or the like. 257,475, 11-4-80, Cl. D7-41.000.

Waterman S.A.: *See—*
Carre, Alain, 257,479, Cl. D10-30.000.

Wilson, Robert L., to Chromcraft Corporation. Bar stool. 257,473, 11-4-80, Cl. D6-35.000.

LIST OF PLANT PATENTEES

Cobia, Barnell L. Plant of the Bromeliaceae family. 4,607, 11-4-80, Cl. 88.000.

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 4TH DAY OF NOVEMBER, 1980

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Frazer, Roy M., to Imperial Chemical Industries Limited. Suction device. T100,001, 11-4-80, Cl. 294-64.00R.

Imperial Chemical Industries Limited: *See*— Frazer, Roy M., T100,001, Cl. 294-64.00R.

CLASSIFICATION OF PATENTS

ISSUED NOVEMBER 4, 1980

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

6	4,231,117
7	4,231,118
48	4,231,119

CLASS 3

1.91	4,231,120
	4,231,121
1.911	4,231,122

CLASS 4

651	4,231,123

CLASS 5

63	4,231,124
419	4,231,125
451	4,231,126
462	4,231,127

CLASS 7

112	4,231,128

CLASS 8

127.6	4,231,747
149.1	4,231,129
159	4,231,130
470	4,231,742
471	4,231,743
495	4,231,744
552	4,231,745
571	4,231,741
584	4,231,749
668	4,231,748
680	4,231,746

CLASS 9

2 C	4,231,131

CLASS 15

56	4,231,132
300 A	4,231,133

CLASS 16

49	4,231,134
150	4,231,135

CLASS 19

7	4,231,136

CLASS 23

230 A	4,231,753
230 B	4,231,750
230 HC	4,231,752
230 R	4,231,751
	4,231,754
293 R	4,231,755

CLASS 24

201 B	4,231,137
205.16 R	4,231,138
	4,231,139
237	4,231,140
243 K	4,231,141

CLASS 29

2.16	4,231,142
281.5	4,231,143
401.1	4,231,144
432	4,231,145
	4,231,146
433	4,231,147
469	4,231,148
578	4,231,149
593	4,231,150
605	4,231,151
621	4,231,152
739	4,231,153
840	4,231,154

CLASS 30

169	4,231,155

CLASS 33

1 LE	4,231,156
18 R	4,231,157
149 J	4,231,158
174 P	4,231,160
174 TD	4,231,159
181 R	4,231,161
284	4,231,162
367	4,231,163

CLASS 34

16	4,231,164
28	4,231,165
48	4,231,166
66	4,231,167

CLASS 35

39	4,231,168

CLASS 36

43	4,231,169
72 R	4,231,170

CLASS 37

54	4,231,171
71	4,231,172
142 R	4,231,173

CLASS 40

10 A	4,231,174
374	4,231,175
395	4,231,176

CLASS 42

16	4,231,177

CLASS 43

	4,231,178
42.06	4,231,179
61	4,231,180

CLASS 44

53	4,231,756
63	4,231,757
71	4,231,758
75	4,231,759

CLASS 46

116	4,231,181
212	4,231,182
262	4,231,183
265	4,231,184

CLASS 47

1 R	4,231,185
74	4,231,186
80	4,231,187
	4,231,188
83	4,231,189

CLASS 48

192	4,231,761
197 R	4,231,760

CLASS 49

25	4,231,190
28	4,231,191
363	4,231,192

CLASS 51

141	4,231,193
211 R	4,231,194
307	4,231,195
309	4,231,762
313	4,231,196

CLASS 52

36	4,231,197
91	4,231,198
	4,231,199
111	4,231,200
169.6	4,231,201
171	4,231,202
284	4,231,203
397	4,231,204
481	4,231,205
529	4,231,206
730	4,231,207
741	4,231,208

CLASS 53

48	4,231,209
397	4,231,210
452	4,231,211
459	4,231,212
497	4,231,213
520	4,231,214

CLASS 55

1	4,231,763
28	4,231,764
90	4,231,765
138	4,231,766
179	4,231,768
186	4,231,767
242	4,231,769
302	4,231,770
408	4,231,771

CLASS 56

11.6	4,231,215
13.6	4,231,216
17.4	4,231,217
377	4,231,218

CLASS 57

290	4,231,219

CLASS 60

276	4,231,220
319	4,231,221
524	4,231,222
527	4,231,223
581	4,231,224
612	4,231,225
648	4,231,226

CLASS 62

2	4,231,772
57	4,231,227
77	4,231,228
196 A	4,231,229
503	4,231,230
514 R	4,231,231

CLASS 64

21	4,231,232
	4,231,233

CLASS 65

1	4,231,773
3 A	4,231,774
30 E	4,231,775
33	4,231,776
109	4,231,777
117	4,231,778
323	4,231,779

CLASS 66

27	4,231,234
236	4,231,235

CLASS 68

15	4,231,236
23.7	4,231,237
62	4,231,238
205 R	4,231,239

CLASS 70

173	4,231,240
195	4,231,241
347	4,231,242
364 A	4,231,243
422	4,231,244

CLASS 71

40	4,231,780
87	4,231,781
	4,231,782
90	4,231,783
92	4,231,784
93	4,231,785
100	4,231,786
107	4,231,787
113	4,231,788
121	4,231,789

CLASS 72

253 A	4,231,245
412	4,231,246
479	4,231,247

CLASS 73

15.6	4,231,248
23	4,231,249
119 A	4,231,251
151	4,231,252
290 V	4,231,250
362 AR	4,231,254
379	4,231,255
421.5 R	4,231,256
432 CR	4,231,257
572	4,231,258
584	4,231,259
597	4,231,260
716	4,231,261
861.04	4,231,262
861.62	4,231,253

CLASS 74

10.33	4,231,263
467	4,231,266
569	4,231,267
572	4,231,268

CLASS 75

0.5 BB	4,231,790
9	4,231,791
53	4,231,792
122	4,231,793
166 C	4,231,794
171	4,231,795
206	4,231,796
256	4,231,797
	4,231,798

CLASS 81

57.3	4,231,271
474	4,231,270

CLASS 83

98	4,231,272
510	4,231,273
820	4,231,274
862	4,231,275

CLASS 84

1.19	4,231,276
	4,231,277
	4,231,278

CLASS 85

9 R	4,231,279
31	4,231,280
50 AT	4,231,281

CLASS 89

7	4,231,282
8	4,231,283

CLASS 91

171	4,231,284

CLASS 92

34	4,231,285
64	4,231,286
94	4,231,287

CLASS 98

43 R	4,231,288
115 SB	4,231,289

CLASS 101

93.11	4,231,290
137	4,231,291
	4,231,292

CLASS 102

7.2	4,231,293

CLASS 104

138 R	4,231,294
245	4,231,295

CLASS 105

136	4,231,296

CLASS 106

58	4,231,800
97	4,231,801
197 C	4,231,802
213	4,231,803

CLASS 108

10	4,231,297
64	4,231,298
91	4,231,299
111	4,231,300
146	4,231,301

CLASS 110

229	4,231,302
245	4,231,303
257	4,231,304

CLASS 111

7	4,231,305
86	4,231,306

CLASS 112

158 E	4,231,307

CLASS 114

144 R	4,231,308
144 RE	4,231,310
162	4,231,309
244	4,231,311
264	4,231,312
265	4,231,313
291	4,231,314

CLASS 118

122	4,231,318
655	4,231,319
657	4,231,320

CLASS 119

1	Re.30,424
	4,231,321
4	4,231,322
14.08	4,231,323
14.17	4,231,324
28	4,231,325
52 R	4,231,326
110	4,231,327

CLASS 122

504	4,231,328

CLASS 123

52 MB	4,231,329
73 AA	Re.30,425
90.15	4,231,330
143 B	Re.30,426
416	4,231,331
	4,231,332
440	4,231,333
	4,231,334
	4,231,335
457	4,231,346
510	4,231,345
512	4,231,347
518	4,231,344
552	4,231,341
556	4,231,343
557	4,231,342
568	4,231,336
	4,231,337
	4,231,338
	4,231,339
	4,231,340
644	4,231,348

CLASS 126

121	4,231,349
133	4,231,350
419	4,231,351
422	4,231,352
443	4,231,353

CLASS 128

1 D	4,231,354
24.2	4,231,355
90	4,231,356
156	4,231,357
168	4,231,358
201.18	4,231,359
	4,231,360
202.26	4,231,361
205.15	4,231,362
205.25	4,231,363
206.15	4,231,364
207.15	4,231,365
214 E	4,231,366
214.4	4,231,367
218 A	4,231,368
283	4,231,369
287	4,231,370
303.1	4,231,371
303.14	4,231,372
660	4,231,373
702	4,231,374
725	4,231,375
748	4,231,376

CLASS 131

9	4,231,377
170 R	4,231,378
235 R	4,231,379

CLASS 132

47	4,231,380
89	4,231,381

CLASS 134

11	4,231,804
	4,231,805
18	4,231,806
64 R	4,231,382

CLASS 136

251	4,231,807
260	4,231,808

CLASS 137

1	4,231,383
62	4,231,384
86	4,231,385
117	4,231,386
218	4,231,387
242	4,231,388
246.22	4,231,440
315	4,231,389
	4,231,390
343	4,231,391
446	Re.30,427
454.2	4,231,392
491	4,231,393
512	4,231,394
514.7	4,231,395
596.13	4,231,396
614.11	4,231,397
615	4,231,398
625.4	4,231,399
798	4,231,400

CLASS 139

383 A	4,231,401
448	4,231,402

CLASS 141

284	4,231,403

CLASS 144

2 R	4,231,404
28.4	4,231,405
208 E	4,231,406

CLASS 148

1.5	4,231,809
	4,231,810
	4,231,811
6.15 R	4,231,812
6.3	4,231,813
11.5 C	4,231,814
24	4,231,815
31.55	4,231,816
32.5	4,231,817
111	4,231,818
175	4,231,819
187	4,231,820

CLASS 149

21	4,231,821
109.6	4,231,822

CLASS 152

351	4,231,407
353 R	4,231,408
354 R	4,231,409
356 R	4,231,410

CLASS 156

64	4,231,823
73.1	4,231,824
78	4,231,825
138	4,231,826
214	4,231,827
230	4,231,828
	4,231,829
232	4,231,830
233	4,231,831
244.14	4,231,832
249	4,231,833
294	4,231,834
361	4,231,835
405 P	4,231,836
522	4,231,837
600	4,231,838

CLASS 159

47 R	4,231,840
47 UA	4,231,839

CLASS 160

120	4,231,411
213	4,231,412

CLASS 162

5	4,231,841
47	4,231,842

CLASS 164

15	4,231,413
154	4,231,414

160 4,231,415
318 4,231,416

CLASS 165

3 4,231,417
4 4,231,418
11 A 4,231,419
40 4,231,420
68 4,231,421
69 4,231,422
105 4,231,423
107 D 4,231,424
156 4,231,425

CLASS 166

252 4,231,426
275 4,231,427
280 4,231,428
362 4,231,429

CLASS 169

57 4,231,430

CLASS 171

46 4,231,431

CLASS 172

7 4,231,432
662 4,231,433

CLASS 173

119 4,231,434
128 4,231,435

CLASS 174

48 4,232,183
92 4,232,184
140 C 4,232,185

CLASS 175

7 4,231,436
325 4,231,437
353 4,231,438

CLASS 176

50 4,231,843

CLASS 177

25 4,231,439

CLASS 178

22 4,232,186
4,232,187

CLASS 179

1 B 4,232,190
1 FS 4,232,192
1 G 4,232,189
1 GD 4,232,191
1.5 R 4,232,193
4,232,194
2 A 4,232,195
2 TV 4,232,196
18 B 4,232,199
18 BC 4,232,198
90 K 4,232,200
100.1 G 4,232,201
100.4 E 4,232,202
103 4,232,203
115.5 R 4,232,204
146 R 4,232,205
175.3 S 4,232,206

CLASS 180

6.48 4,231,441
14 R 4,231,442
53 D 4,231,443
294 4,231,444

CLASS 181

148 4,231,445
4,231,446
213 4,231,447

CLASS 182

93 4,231,448
164 4,231,449

CLASS 187

9 R 4,231,450

CLASS 188

73.1 4,231,451
171 4,231,452

CLASS 190

11 4,231,453

CLASS 192

4 A 4,231,455
4 R 4,231,454
58 B Re.30,428
70.25 4,231,456
82 T 4,231,457

CLASS 194

4 F 4,231,458

CLASS 196

46 4,231,459

CLASS 198

341 4,231,460
347 4,231,461
380 4,231,462
446 4,231,463
456 4,231,464
460 4,231,465
479 4,231,466
508 4,231,467
515 4,231,468
779 4,231,469
797 4,231,470
836 4,231,471

CLASS 200

11 R 4,232,207

CLASS 201

34 4,231,844

CLASS 202

113 4,231,845
248 4,231,846

CLASS 204

7 4,231,847
20 4,231,848
59 F 4,231,849
181 C 4,231,850
181 R 4,231,851
196 4,231,852
243 R 4,231,853
294 4,231,854
301 4,231,855

CLASS 206

309 4,231,472
387 4,231,473
4,231,474
389 4,231,475
519 4,231,476
532 4,231,477

CLASS 208

39 4,231,856
40 4,231,857
89 4,231,858

CLASS 209

11 4,231,859
169 4,231,860
240 4,231,861
576 4,231,478

CLASS 210

87 4,231,871
93 4,231,872
170 4,231,873
195.4 4,231,874
232 4,231,875
4,231,876
321 B 4,231,877
4,231,878
4,231,879
4,231,880
396 4,231,881
601 4,231,862
615 4,231,863
636 4,231,865
660 4,231,866
669 4,231,864
703 4,231,867
728 4,231,868
763 4,231,869
797 4,231,870

CLASS 215

250 4,231,479
329 4,231,480

CLASS 219

10.55 C 4,232,210
69 W 4,232,208
137.41 4,232,209
202 4,232,211
216 4,232,212
4,232,213
541 4,232,214

CLASS 220

1.5 4,231,481
5 A 4,231,482
66 4,231,483
89 A 4,231,484
210 4,231,485
266 4,231,486
269 4,231,487
288 4,231,488
304 4,231,489
354 4,231,490

CLASS 221

48 4,231,491

CLASS 222

1 4,231,492
321 4,231,493
325 4,231,494
345 4,231,495
414 4,231,496
527 4,231,497
602 4,231,498

CLASS 223

94 4,231,499
96 4,231,500

CLASS 224

42.46 R 4,231,501
177 4,231,502

CLASS 225

2 4,231,503

CLASS 226

180 4,231,504

CLASS 228

14 4,231,505
109 4,231,506
131 4,231,507
219 4,231,508

CLASS 229

22 4,231,509
39 B 4,231,510

CLASS 235

78 RC 4,232,215
375 4,231,511
449 4,232,216
480 4,232,217

CLASS 236

47 4,231,512
49 4,231,513
4,231,514
87 4,231,515

CLASS 237

51 4,231,516

CLASS 238

10 F 4,231,517

CLASS 239

81 4,231,518
102 4,231,519
171 4,231,520
230 4,231,521
233 4,231,522
454 4,231,523
468 4,231,524
585 4,231,525

CLASS 241

28 4,231,526
169.1 4,231,527
182 4,231,528
189 R 4,231,529
223 4,231,530

CLASS 242

18.1 4,231,531
199 4,231,532

CLASS 244

3.16 4,231,533
4,231,534
110 C 4,231,535
135 A 4,231,536
160 4,231,537
169 Re.30,429

CLASS 248

226.1 4,231,538
418 4,231,539
487 4,231,540

CLASS 249

216 4,231,541

CLASS 250

222 PC 4,232,218
227 4,232,219
270 4,232,220
311 4,232,221
333 4,232,222
343 4,232,223
356 4,232,224
361 C 4,232,225
445 T 4,232,226
468 4,232,227
492 R 4,232,228
541 4,232,229

CLASS 251

15 4,231,542
57 4,231,543
144 4,231,544
161 4,231,545
173 4,231,546
210 4,231,547
282 4,231,548
335 A 4,231,549

CLASS 252

8.55 C 4,231,882
33.4 4,231,883
62 4,231,884
70 4,231,885
117 4,231,886
174.19 4,231,887
182 4,231,888
182.1 4,231,889
186 4,231,890
188 4,231,891
301.6 F 4,231,892
313 R 4,231,893
389 A 4,231,894
400 A 4,231,895
431 R 4,231,896
441 4,231,897
4,231,898
455 Z 4,231,899
466 PT 4,231,900
511 4,231,901
519 4,231,902
545 4,231,903
557 4,231,904

CLASS 254

124 4,231,550
344 4,231,551

CLASS 256

24 4,231,552

CLASS 260

17 A 4,231,905
19 N 4,231,906
23 AR 4,231,907
28.5 AS 4,231,908
29.1 SB 4,231,909
29.4 R 4,231,910
29.6 NR 4,231,911
29.7 SQ 4,231,912
30.8 R 4,231,913
31.8 N 4,231,914
31.8 R 4,231,915
37 EP 4,231,916
37 SB 4,231,917
40 P 4,231,918
42.53 4,231,919
45.7 S 4,231,920
45.75 R 4,231,921
45.95 G 4,231,922
112.5 R 4,231,923
4,231,924
4,231,925
123.7 4,231,926
239.1 4,231,927
4,231,928
243.3 4,231,929
245.5 4,231,930
325 PH 4,231,931
326 A 4,231,932
326.24 4,231,936
326.5 B 4,231,935
326.5 FL 4,231,933
326.5 FM 4,231,934
340.2 4,231,937
343.5 4,231,938
343.6 4,231,939
345.1 4,231,940
346.11 4,231,941
346.71 4,231,942
346.75 Re.30,430
4,231,943
347.4 4,231,944
347.7 4,231,945
397.4 4,231,946
429 R 4,231,947
429.5 4,231,948
429.7 4,231,949
438.5 R 4,231,950
446 4,231,951
453 P 4,231,952
465 D 4,231,953
4,231,954
465.1 4,231,955
465.8 R 4,231,956
505 C 4,231,957
507 R 4,231,958
544 K 4,231,959
931 4,231,970

CLASS 261

44 B 4,231,971
44 D 4,231,972
78 A 4,231,973
87 4,231,974
99 4,231,975

CLASS 264

0.5 4,231,976
33 4,231,977
63 4,231,978
81 4,231,979
84 4,231,980
102 4,231,981
112 4,231,982
249 4,231,983
256 4,231,984
262 4,231,985
272 4,231,986
328.1 4,231,987

CLASS 266

113 4,231,553

CLASS 267

65 D 4,231,554
154 4,231,555

CLASS 269

22 4,231,556
139 4,231,557

CLASS 270

60 4,231,558

CLASS 271

3.1 4,231,561
4,231,562
18.3 4,231,563
95 4,231,564
105 4,231,565
117 4,231,566
259 4,231,567

CLASS 272

122 4,231,569
123 4,231,570
136 4,231,568

CLASS 273

1 E 4,231,571
29 A 4,231,572
51 4,231,573
68 4,231,574
73 D 4,231,575
183 D 4,231,576
238 4,231,577

CLASS 277

121 4,231,578
205 4,231,579

CLASS 279

19.1 4,231,580
19.4 4,231,581

CLASS 280

87.02 W 4,231,582
166 4,231,583
604 4,231,584
615 4,231,585
637 4,231,586
647 4,231,587
661 4,231,588
781 4,231,589
803 4,231,590
806 4,231,591
808 4,231,592

CLASS 283

6 4,231,593

CLASS 285

3 4,231,594
38 4,231,595
382.2 4,231,596

CLASS 290

53 4,232,230

CLASS 292

164 4,231,597
210 4,231,598
339 4,231,599

CLASS 293

128 4,231,600
136 4,231,601

CLASS 294

1 BA 4,231,602
19 R 4,231,603
59 4,231,604
87.2 4,231,605

CLASS 296

43 4,231,606
63 4,231,607
167 4,231,610
216 4,231,608
218 4,231,609

CLASS 297

195 4,231,611
250 4,231,612
4,231,613
330 4,231,614
452 4,231,615
481 4,231,616

CLASS 299

2 4,231,617
31 4,231,618

CLASS 301

37 P 4,231,619

CLASS 303

119 4,231,620

CLASS 307

10 R 4,232,231
139 4,232,232
229 4,232,233
252 G 4,232,234
252 R 4,232,235
297 4,232,236

CLASS 308

6 C 4,231,621
22 4,231,622
23 4,231,623

CLASS 310

13 4,232,237
68 D 4,232,238
312 4,232,239
313 A 4,232,240
317 4,232,241

CLASS 312

186 4,231,624
245 4,231,625
350 4,231,626

CLASS 313

120 4,232,242
217 4,232,243
363 4,232,244
367 4,232,245
414 4,232,246
474 4,232,247
479 4,232,248

CLASS 315

3.6 4,232,249
13 ST 4,232,250
92 4,232,252
167 4,232,251
370 4,232,253
408 4,232,254

CLASS 316

25 4,231,627

CLASS 318

143 4,232,255
292 4,232,256
314 4,232,257
345 H 4,232,258
615 4,232,259

CLASS 320

2 4,232,260

CLASS 323

22 R 4,232,261

CLASS 324

65 P 4,232,262
77 B 4,232,263
96 4,232,264
260 4,232,265

CLASS 328

138 4,232,267

CLASS 329

103 4,232,268

CLASS 330

85 4,232,269
253 4,232,270
258 4,232,271
294 4,232,272
298 4,232,273

CLASS 331

94.5 D 4,232,275
4,232,276
94.5 S 4,232,274
107 DP 4,232,277

CLASS 333

13 4,232,278
165 4,232,279
213 4,232,280

CLASS 335

152 4,232,281
202 4,232,282
212 4,232,283

CLASS 336

90 4,232,284

CLASS 339

17 LC 4,231,628
17 M 4,231,629
22 R 4,231,630

94 A 4,231,631
97 R 4,231,632
242 4,231,633

CLASS 340

38 L 4,232,285
51 4,232,286
52 E 4,232,287
63 4,232,288
64 4,232,289
146.3 Z 4,232,290
147 LP 4,232,294
147 MD 4,232,291
147 R 4,232,293
147 SY 4,232,292
152 R 4,232,295
167 R 4,232,296
168 S 4,232,297
171 R 4,232,298
4,232,299
347 AD 4,232,302
366 B 4,232,304
366 R 4,232,303
384 E 4,232,305
506 4,232,306
515 4,232,307
539 4,232,308
547 4,232,309
550 4,232,310
703 4,232,311
753 4,232,312
789 4,232,301
840.39 4,232,300

CLASS 343

6 R 4,232,313
7 PF 4,232,314
7.3 4,232,315
108 R 4,232,316
112 R 4,232,317
703 4,232,319
765 4,232,320
778 4,232,321
781 P 4,232,322

CLASS 346

74.1 4,232,323
75 4,232,324
76 R 4,232,325

CLASS 350

4.2 4,231,634
96.23 4,231,635
175 FS 4,231,636
175 ML 4,231,637
255 4,231,638
335 4,231,639
336 4,231,640
357 4,231,641

CLASS 352

58 4,231,642

CLASS 353

86 4,231,643

CLASS 354

51 4,231,644
145 4,231,645
195 4,231,646
4,231,647
4,231,648
224 4,231,649
246 4,231,650
288 4,231,651

CLASS 355

3 DR 4,231,652
3 FU 4,231,653
38 4,231,654
40 4,231,655
71 4,231,656
4,231,657
110 4,231,658
132 4,231,659

CLASS 356

244 4,231,660
340 4,231,661
373 4,231,662
432 4,231,663

CLASS 357

23 4,232,326
4,232,327
49 4,232,328

CLASS 358

9 4,232,329
31 4,232,330
44 4,232,331
67 4,232,332
93 4,232,333
4,232,334
101 4,232,335
106 4,232,336
128.5 4,232,337
136 4,232,338
150 4,232,339
167 4,232,340
250 4,232,341
296 4,232,342
4,232,343
298 4,232,344
299 4,232,345

CLASS 360

71 4,232,346
73 4,232,347
74.1 4,232,348
105 4,232,349
132 4,232,350

CLASS 361

56 4,232,351
120 4,232,352
172 4,232,353
4,232,354
235 4,232,355
415 4,232,356

CLASS 362

61 4,232,357
97 4,232,358
268 4,232,359
294 4,232,360
364 4,232,361
410 4,232,362

CLASS 363

75 4,232,363

CLASS 364

105 4,232,364
200 4,232,365
4,232,366
408 4,232,367
431 4,232,368
476 4,232,369
478 4,232,370
561 4,232,371
566 4,232,372
572 4,232,373
900 4,232,374
4,232,375

CLASS 365

222 4,232,376
229 4,232,377

CLASS 366

35 4,231,664
165 4,231,665
304 4,231,666

CLASS 367

36 4,232,378
43 4,232,379
88 4,232,380
135 4,232,381

CLASS 368

1 4,232,382
66 4,232,383
185 4,232,384

CLASS 370

3 4,232,385
24 4,232,188
29 4,232,318
68 4,232,386
79 4,232,266
97 4,232,197

CLASS 371

47 4,232,387

CLASS 375

110 4,232,388

CLASS 400

208 4,231,667

CLASS 401

146 4,231,668
258 4,231,669

CLASS 403

11 4,231,670
13 4,231,671
62 4,231,672
125 4,231,673
233 4,231,674
252 4,231,675

CLASS 404

6 4,231,676
89 4,231,677
103 4,231,678

CLASS 405

4 4,231,679
31 4,231,680
195 4,231,681
202 4,231,682
260 4,231,683
291 4,231,684
296 4,231,685

CLASS 406

14 4,231,686
52 4,231,687
76 4,231,688
155 4,231,689

CLASS 408

80 4,231,690
185 4,231,691
230 4,231,692
4,231,693

CLASS 409

179 4,231,694

CLASS 410

69 4,231,695

CLASS 414

5 4,231,696
37 4,231,697
244 4,232,016
343 4,231,708
458 4,231,709
475 4,231,710
624 4,231,698
687 4,231,699
700 4,231,700
730 4,231,701

CLASS 415

56 4,231,702
159 4,231,703

CLASS 416

95 4,231,704
108 R 4,231,705
186 R 4,231,706

CLASS 417

12 4,231,707
100 4,231,711
4,231,712
222 4,231,713
229 4,231,714
307 4,231,715
315 4,231,716
364 4,231,717
366 4,231,718
4,231,719
379 4,231,720
413 4,231,721
418 4,231,722
429 4,231,723
472 4,231,724
477 4,231,725

CLASS 418

75 4,231,726
76 4,231,727
79 4,231,728

CLASS 422

47 4,231,988
63 4,231,989
100 4,231,990
245 4,231,991
258 4,231,992

CLASS 423

34 4,231,993
70 4,231,994
242 4,231,995
4,231,996
263 4,231,997
449 4,231,998

CLASS 424

1 4,231,999
4,232,000
4,232,001
45 4,232,002
81 4,232,003
89 4,232,004
114 4,232,005
177 4,232,006
4,232,007
4,232,008
180 4,232,009
200 4,232,010
4,232,011
232 4,232,012
241 4,232,013
243 4,232,015
246 4,232,017
248.55 4,232,018
248.56 4,232,019
4,232,020
250 4,232,021
251 4,232,022
4,232,023
4,232,024
256 4,232,025
258 4,232,026
4,232,027
260 4,232,028
263 4,232,029
4,232,030
4,232,031
269 4,232,032
4,232,033
4,232,034
270 4,232,035
274 4,232,036
4,232,037
4,232,038
278 4,232,039
283 4,232,040
304 4,232,041
308 4,232,042
324 4,232,014
340 4,232,043

CLASS 425

79 4,231,729
385 4,231,730

CLASS 426

44 4,232,044
62 4,232,045
69 4,232,046
96 4,232,047
115 4,232,048
572 4,232,049
582 4,232,050
4,232,051
601 4,232,052
616 4,232,053
618 4,232,054

CLASS 427

33 4,232,055
37 4,232,056
39 4,232,057
54.1 4,232,058
94 4,232,063
96 4,232,059
98 4,232,060
130 4,232,061
160 4,232,062
208.4 4,232,064
226 4,232,065
430.1 4,232,066

CLASS 428

17 4,232,067
43 4,232,068
47 4,232,069
49 4,232,070
64 4,232,071
65 4,232,072
91 4,232,073
110 4,232,074
124 4,232,075
158 4,232,076
174 4,232,077
195 4,232,078
4,232,079
215 4,232,080
217 4,232,081
225 4,232,082
307 4,232,083
309 4,232,084
315 4,232,085
341 4,232,086
389 4,232,087
412 4,232,088
413 4,232,089
424.4 4,232,090
472 4,232,091
542 4,232,092
591 4,232,093
614 4,232,094
654 4,232,095
683 4,232,096

CLASS 429

44 4,232,097
104 4,232,098
152 4,232,099
217 4,232,100

CLASS 430

56 4,232,101
58 4,232,102
59 4,231,799
4,232,103
68 4,232,104
160 4,232,105
170 4,232,106
223 4,232,107
259 4,232,108
312 4,232,109
313 4,232,110
355 4,232,111
393 4,232,112
450 4,232,113
504 4,232,114
510 4,232,116
522 4,232,115
539 4,232,117
574 4,232,118

CLASS 431

38 4,231,731
46 4,231,732
76 4,231,733
274 4,231,734
328 4,231,735

CLASS 433

6 4,231,736
78 4,231,737
102 4,231,738
126 4,231,739
208 4,231,740

CLASS 435

7 4,232,119
30 4,232,120
32 4,232,121
52 4,232,122
69 4,232,123
212 4,232,124

CLASS 440

43 4,231,315
50 4,231,317
86 4,231,316

CLASS 455

12 4,232,389
77 4,232,390
96 4,232,391
105 4,232,392
154 4,232,393
158 4,232,394
173 4,232,395
179 4,232,396
4,232,397
226 4,232,398
276 4,232,399
305 4,232,400
328 4,232,401

CLASS 474

80 4,231,264
152 4,231,265

CLASS 493

29 4,231,560
426 4,231,559

CLASS 521

32 4,232,125
65 4,232,126
106 4,232,127
134 4,232,128
137 4,232,129
143 4,232,130

CLASS 525

184 4,232,131
222 4,232,132
327 4,232,136
452 4,232,133
479 Re.30,431
506 4,232,134
509 4,232,135

CLASS 526

71 4,232,137
122 4,232,138
125 4,232,139
129 4,232,140
344.2 4,232,141

CLASS 528

125 4,232,142
128 4,232,143
4,232,144
324 4,232,145
395 4,232,146

CLASS 536

4 4,232,147
17 R 4,232,148
23 4,232,149
119 4,232,150

CLASS 544

90 4,232,151
119 4,232,152
204 4,232,153
250 4,232,154
277 4,232,155
335 4,232,156

CLASS 546

68 4,232,157
72 4,232,158
112 4,232,159
146 4,232,160
279 4,232,161

CLASS 548

111 4,232,162
195 4,232,163
240 4,232,164
339 4,232,165

CLASS 560

121 4,232,166
154 4,232,167
174 4,232,168
4,232,169
179 4,232,170
239 4,232,171

CLASS 562

423 4,232,172
430 4,232,173
599 4,232,174

CLASS 564

65 4,231,961
73 4,231,960
272 4,231,962
305 4,231,964
443 4,231,963

CLASS 568

327 4,231,965
396 4,231,966
433 4,231,967
706 4,232,175
756 4,232,176

CLASS 570

109 4,231,968
223 4,231,969

CLASS 585

324 4,232,177
408 4,232,178
640 4,232,179
645 4,232,180
739 4,232,181
820 4,232,182

CLASSIFICATION OF DESIGNS

D3—	52	257,471	D8—	316	257,476	D15—	140	257,481	D23—	151	257,485			257,489	D30—	1	257,493
D6—	29	257,472	D9—	408	257,477	D21—	6	257,482	D24—	9	257,486		37	257,490		16	257,494
	35	257,473	D10—	30	257,479		212	257,483			257,487	D28—	13	257,491		32	257,495
	95	257,474		45	257,480			257,484			257,488			257,492	D99—	47	257,478
D7—	41	257,475															

CLASSIFICATION OF PLANTS

	88	4,607															

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

294—	64 R	T100,001															

GEOGRAPHICAL INDEX
OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

4 : 4,231,568
6 : 4,231,135
4,231,532
4,231,544
4,231,550
4,231,634
4,231,731
4,231,811
4,231,824
4,231,873
4,231,943
4,231,953
4,231,971
4,231,975
4,232,038
4,232,250
4,232,257
4,232,271
4,232,276
4,232,279
4,232,294
4,232,310
4,232,359
8 : 4,231,983
4,231,998
4,232,072
4,232,324
01 : 4,231,352
4,231,695
4,232,154
02 : 4,231,131
04 : 4,231,332
4,231,389
4,231,670
4,231,807
4,231,916
4,232,315
06 : 4,231,153
4,231,156
4,231,175
4,231,183
4,231,241
4,231,249
4,231,256
4,231,278
4,231,284
4,231,287
4,231,311
4,231,312
4,231,314
4,231,363
4,231,364
4,231,373
4,231,387
4,231,398
4,231,407
4,231,418
4,231,438
4,231,444
4,231,496
4,231,513
4,231,527
4,231,534
4,231,556
4,231,562
4,231,574
4,231,578
4,231,591
4,231,614
4,231,642
4,231,654
4,231,674
4,231,675
4,231,702
4,231,708
4,231,747
4,231,767
4,231,780
4,231,785
4,231,788
4,231,801
4,231,847
4,231,865
4,231,871
4,231,959
4,231,973
4,232,025
4,232,040
4,232,051
4,232,060
4,232,063
4,232,070
4,232,075
4,232,093
4,232,146
4,232,194
4,232,201
4,232,221
4,232,244
4,232,253
4,232,270
4,232,275
4,232,280
4,232,314
4,232,337
4,232,351
4,232,363
4,232,366
4,232,367
4,232,374
4,232,381
4,232,386
4,232,388
4,232,389
4,232,390
4,232,401
08 : 4,231,126
4,231,194
4,231,300
4,231,372
4,231,408
4,231,464
4,231,528
09 : 4,231,140
4,231,454
4,231,626
4,231,659
4,231,662
4,231,734
4,231,775
4,232,018
4,232,045
4,232,168
4,232,173
4,232,220
10 : 4,231,535
4,231,784
4,232,108
4,232,143
4,232,144
4,232,174
4,232,233
12 : 4,231,162
4,231,179
4,231,304
4,231,333
4,231,401
4,231,446
4,231,489
4,231,493
4,231,523
4,231,541
4,231,610
4,231,625
4,231,769
4,231,843
4,231,992
4,232,006
4,232,059
4,232,074
4,232,239
4,232,355
4,232,396
13 : 4,231,177
4,231,299
4,231,301
4,231,433
4,231,633
4,231,689
4,231,777
4,231,831
17 : 4,231,180
4,231,192
4,231,205
4,231,208
4,231,281
4,231,290
4,231,293
4,231,296
4,231,335
4,231,349
4,231,391
4,231,453
4,231,468
4,231,471
4,231,472
4,231,487
4,231,494
4,231,509
4,231,512
4,231,560
4,231,581
4,231,599
4,231,605
4,231,676
4,231,725
4,231,726
4,231,759
4,231,806
4,231,861
4,231,897
4,231,924
4,232,001
4,232,047
4,232,084
4,232,138
4,232,147
4,232,183
4,232,189
4,232,200
4,232,207
4,232,215
4,232,260
4,232,304
4,232,320
4,232,339
4,232,342
4,232,361
18 : Re.30,427
Re.30,430
4,231,196
4,231,261
4,231,358
4,231,455
4,231,604
4,231,606
4,231,754
4,231,792
4,231,909
4,231,920
4,231,939
4,232,065
4,232,340
19 : 4,231,185
4,231,546
4,232,097
20 : 4,231,190
4,231,286
4,231,656
4,231,710
4,232,046
4,232,163
4,232,357
21 : 4,231,157
4,231,166
4,231,237
4,231,665
22 : 4,231,279
4,231,572
4,231,804
4,231,805
4,231,898
23 : Re.30,424
4,231,772
4,232,087
24 : 4,231,259
4,231,359
4,231,376
4,231,519
4,231,603
4,231,661
4,231,697
4,231,763
4,231,878
4,232,004
4,232,277
4,232,278
4,232,299
25 : 4,231,187
4,231,260
4,231,292
4,231,425
4,231,465
4,231,524
4,231,542
4,231,577
4,231,645
4,231,709
4,231,819
4,231,828
4,231,855
4,231,901
4,231,929
4,231,947
4,231,950
4,232,028
4,232,058
4,232,079
4,232,099
4,232,140
4,232,240
4,232,284
4,232,307
4,232,358
4,232,362
4,232,376
4,232,380
4,232,399
26 : Re.30,428
Re.30,431
4,231,163
4,231,193
4,231,222
4,231,223
4,231,225
4,231,254
4,231,267
4,231,285
4,231,342
4,231,362
4,231,501
4,231,525
4,231,540
4,231,554
4,231,588
4,231,608
4,231,609

4,231,630
4,231,693
4,231,765
4,231,883
4,231,902
4,231,907
4,231,910
4,232,003
4,232,014
4,232,021
4,232,041
4,232,055
4,232,125
4,232,127
4,232,129
4,232,148
4,232,160
4,232,164
4,232,175
4,232,211
4,232,217
4,232,256
4,232,287
4,232,319
4,232,354
4,232,356
4,232,370
4,232,372
27 : 4,231,326
4,231,450
4,231,515
4,231,595
4,231,837
4,231,951
4,231,965
4,232,043
4,232,049
4,232,053
4,232,083
4,232,192
4,232,365
28 : 4,231,173
4,231,830
29 : 4,231,239
4,231,280
4,231,325
4,231,732
4,231,782
4,231,783
4,231,786
4,231,800
4,231,803
4,231,826
4,231,874
4,231,926
4,231,978
4,231,993
30 : 4,231,327
31 : 4,231,384
32 : 4,231,891
4,231,994
33 : 4,232,195
4,232,199
34 : Re.30,429
4,231,129
4,231,229
4,231,298
4,231,354
4,231,452
4,231,475
4,231,488
4,231,511
4,231,570
4,231,587
4,231,624
4,231,643
4,231,752
4,231,781
4,231,795
4,231,822
4,231,839
4,231,895
4,231,903
4,231,922
4,231,937
4,231,938
4,231,940
4,231,941
4,231,944
4,231,945
4,231,948
4,231,955
4,231,969
4,231,986
4,232,008
4,232,026
4,232,027
4,232,030
4,232,036
4,232,052
4,232,076
4,232,110
4,232,170
4,232,184
4,232,186
4,232,197
4,232,249
4,232,266
4,232,273
4,232,313
4,232,327
4,232,328
4,232,334
4,232,338
35 : 4,231,253
4,231,350
4,231,440
4,232,225
36 : 4,231,144
4,231,154
4,231,161
4,231,164
4,231,181
4,231,195
4,231,228
4,231,291
4,231,308
4,231,318
4,231,321
4,231,367
4,231,371
4,231,378
4,231,383
4,231,405
4,231,412
4,231,417
4,231,421
4,231,423
4,231,449
4,231,473
4,231,498
4,231,502
4,231,567
4,231,586
4,231,637
4,231,638
4,231,677
4,231,698
4,231,729
4,231,736
4,231,739
4,231,751
4,231,758
4,231,768
4,231,771
4,231,816
4,231,887
4,231,892
4,231,917
4,231,919
4,231,935
4,231,949
4,231,958
4,231,970
4,231,974
4,231,985
4,232,056
4,232,057
4,232,098
4,232,102
4,232,103
4,232,115
4,232,121
4,232,150
4,232,161
4,232,166
4,232,187
4,232,190
4,232,230
4,232,252
4,232,311
4,232,321
4,232,329
4,232,353
37 : 4,231,125
4,231,128
4,231,150
4,231,219
4,231,377
4,231,432
4,231,514
4,231,629
4,231,770
4,231,835
4,231,923
4,232,088
4,232,282
39 : 4,231,119
4,231,143
4,231,197
4,231,204
4,231,217
4,231,231
4,231,246
4,231,248
4,231,262
4,231,351
4,231,370
4,231,390
4,231,396
4,231,399
4,231,410
4,231,463
4,231,467
4,231,491
4,231,492
4,231,505
4,231,533
4,231,573
4,231,596
4,231,597
4,231,598
4,231,611
4,231,612
4,231,663
4,231,668
4,231,699
4,231,700
4,231,713
4,231,721
4,231,735
4,231,757
4,231,766
4,231,773
4,231,778
4,231,815
4,231,825
4,231,832
4,231,911
4,231,980
4,231,995
4,232,000
4,232,050
4,232,068
4,232,180
4,232,181
4,232,262
4,232,281
4,232,302
4,232,308
40 : 4,231,147
4,231,242
4,231,288
4,231,428
4,231,429
4,231,436
4,231,445
4,231,516
4,231,753
4,231,869
4,231,882
4,232,137
4,232,167
41 : 4,231,210
4,231,388
4,231,482
4,231,664
4,231,866
4,232,066
4,232,377
4,232,382
42 : Re.30,425
4,231,117
4,231,122
4,231,138
4,231,170
4,231,191
4,231,214
4,231,328
4,231,361
4,231,375
4,231,420
4,231,439
4,231,462
4,231,470
4,231,507
4,231,520
4,231,549
4,231,582
4,231,583
4,231,593
4,231,602
4,231,617
4,231,628
4,231,690
4,231,696
4,231,724
4,231,733
4,231,743
4,231,760
4,231,764
4,231,802
4,231,809
4,231,818
4,231,820
4,231,827
4,231,833
4,231,838
4,231,853
4,231,858
4,231,863
4,231,867
4,231,894
4,231,899
4,231,908
4,231,925
4,231,954
4,231,979
4,231,996
4,232,090
4,232,126
4,232,133
4,232,152
4,232,158
4,232,218
4,232,224
4,232,232
4,232,245
4,232,283
4,232,300
4,232,364
43 : 4,231,199
4,232,391
44 : 4,231,188
4,231,294
4,232,373
45 : 4,231,141
4,231,184
47 : 4,231,744
4,231,121
4,231,178
4,231,209
4,231,227
4,231,230
4,231,756
4,231,796
4,232,336
48 : 4,231,148
4,231,149
4,231,174
4,231,200
4,231,365
4,231,381
4,231,426
4,231,427
4,231,459
4,231,503
4,231,671
4,231,750
4,231,813
4,231,823
4,231,896
4,231,905
4,231,956
4,232,069
4,232,177
4,232,289
4,232,317
4,232,378
4,232,398
49 : 4,231,579
4,231,821
4,231,859
4,231,884
50 : 4,231,282
51 : 4,231,151
4,231,155
4,231,322
4,231,413
4,231,537
4,231,569
4,231,774
4,232,255
4,232,295
53 : 4,231,160
4,231,247
4,231,481
4,231,536
4,231,576
4,231,616
4,231,622
4,231,714
4,232,092
4,232,228
54 : 4,232,035
55 : 4,231,215
4,231,272
4,231,316
4,231,434
4,231,480
4,231,539
4,231,557
4,231,558
4,231,623
4,231,886
4,232,085

DESIGN PATENTS

01 : 257,486
257,487
257,488
257,489
04 : 257,471
06 : 257,480
257,483
257,484
257,490
09 : 257,477
12 : 257,481
257,494
21 : 257,478
26 : 257,493
27 : 257,495
28 : 257,473
29 : 257,474
36 : 257,491
257,492
39 : 257,482
257,485
41 : 257,476

PLANT PATENTS

12 : 4,607

U.S. GOVERNMENT PRINTING OFFICE : O—1980

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

U.S. DEPARTMENT OF COMMERCE
Philip M. Klutznick, *Secretary*

PATENT AND TRADEMARK OFFICE
Sidney A. Diamond, *Commissioner*